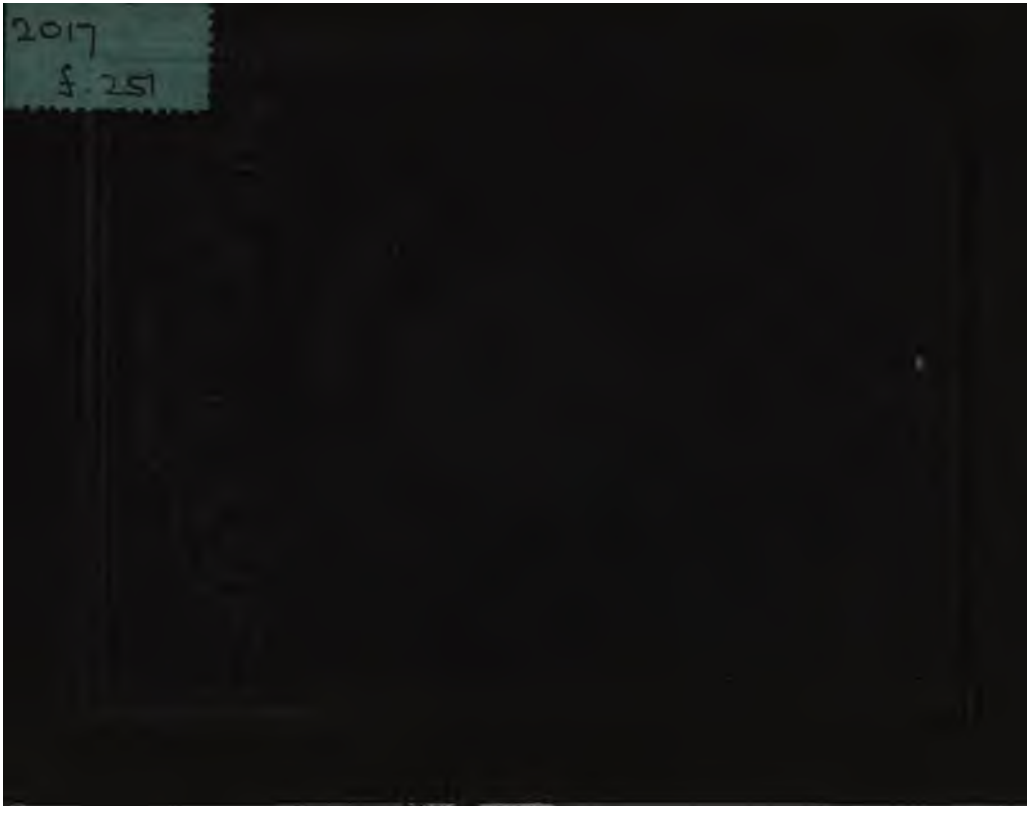
2017
£.25

2017. J. 25

THE

GEOGRAPHICAL READING BOOK;

BEING A SERIES OF

INDUCTIVE LESSONS IN GEOGRAPHY.

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Second Edition.

LONDON:
GROOMBRIDGE AND SONS, PATERNOSTER ROW.
BRISTOL: W. AND F. MORGAN, CLARE STREET.

1857.

Entered at Stationers' Hall.

PREFACE.

GEOGRAPHY is now so common a part of elementary education, that no apology is needed for any attempt to improve the means whereby it may be taught. In many cases the teaching of Geography consists of little more than a dry iteration of names and glancing at maps. And when a more extended course is attempted, it is too often taught dogmatically, and without the natural connection of cause and effect. Thus, the *memory* only is taxed, while no exercise whatever is given to the *reasoning* faculties.

The important field of *Physical Geography*, though admirably explored, is almost a barren waste to the majority of pupils in Elementary Schools. Many children who can name the rivers of Syria or the bays of Norway, are ignorant of the common philosophy of a river, or the nature and utility of a bay.

Yet, these pupils only need to be taught *how*, and it will be found that they *can reason* well enough: and there is no subject on which the reasoning powers can be more profitably or more pleasantly employed, for, herein may be found the pleasures of demonstration without the fatigue of abstraction.

The following pages have been prepared with a view to remedy the above defects: to help beginners to *observe*, to *compare*, and to *reason generally* on the leading facts and principles of Geography. To the ordinary Text Books on the subject, we trust our little book will be found a necessary preliminary.

We have adopted the form and style of READING LESSONS, from a conviction of the suitability of the subject for such a purpose. We believe that the art of reading is most readily acquired when the general intelligence of the pupil is awakened and sustained by the *subject matter* of the lessons read: and *Geography*, by the vast variety and interesting character of its facts, near as well as remote, is peculiarly suitable, as a subject, for such a *connected* series of Lessons. It may well be

doubted, whether the *miscellaneous* extracts of which many School Reading Books consist, are so conducive to habits of accurate and continuous thought, as a series of *connected lessons* on a definite subject. For, in such a course, each lesson is valuable, not only for itself, but for all others that either precede or follow it: this method also tends to correct the volatile and discursive habits now so prevalent, by disciplining the mind, not only to learn the facts more *thoroughly*, but also to group them together so as to show their relations and purpose.

We have based our Lessons on *observation*, that of the pupil himself where practicable:—we have made them *progressive*, both as to the subjects treated of and the language used:—and, above all, we have endeavoured to give each lesson a thorough tone of *inductiveness*, which will, we believe, be of greater value than even the actual information contained; although this comprehends the most important physical and social features of our own country, and, to a smaller extent, those of the world generally.

The Lessons, though somewhat longer than those usually supplied to children of the status for whom they are intended, will, nevertheless, be quite as readily mastered, and for this obvious reason,—they are generally *self-explanatory*. It thus follows, that while they do not render oral teaching unnecessary, they do limit its operation to more legitimate channels. Much time, that, with the existing Reading Books must be spent in *translating the language of the book into the language of the child*, is saved, and may be devoted to the more useful and interesting occupation of intelligent and less interrupted reading.

LIST OF SUBJECTS.

GEOGRAPHICAL READING LESSONS.

LESSON I.

HOME OBSERVATION.

We all know something of the place in which we live. We have seen its houses, roads, and fields, so often, that we can easily point them out and tell how they are situated. We also know something about the towns and villages near, from having seen them. This is a little knowledge of Geography; and in this way a knowledge of Geography is best obtained. We cannot expect, however, to get an extended knowledge of distant parts by our *own* observation; we must therefore learn most of our Geography from what *others* have observed. Books of travels and voyages supply information of this kind.

It will help us to understand much of what we read

about other parts, if we take notice of things and places near our own home. For this purpose we should learn all we can respecting the place we live in;—what it is called;*—what streams or rivers are near;—what hills and valleys are close by;—how many houses and people belong to the place;—how most of the people are employed;—what articles or goods they make;—what is grown in the fields; and many other facts of this kind.

Then, having learned all we can about the place we live in, we may enquire the names of the towns, villages, hills and rivers near. The *towns*, we shall learn, have a market; the *villages* are generally smaller than the towns, and have no regular market. We may then enquire what each place produces, and other remarkable facts about it.

We shall thus get acquainted with the *Geography of our own neighbourhood.* We may then learn that several towns, villages, hills, valleys, fields and meadows, make up what is called a *county:* which therefore consists of a large tract of country, more indeed than we can generally

* The teacher will of course elicit names and other local particulars in the course of questioning on this lesson.

see from the top of a high hill. The county* we live in is several miles † in length and breadth, so that it would be a long day's work to walk through it.

There are as many as *forty* counties in *England*, which is the most important part of Great Britain. England, therefore, contains a great many cities, towns, villages and other places: together with a large number of hills and valleys, rivers and lakes. It would take us more than a year to travel through all parts of England.

Our division of the world, which is called *Europe*, contains many other countries besides England. The land in the whole world, however, is nearly twenty times as large as Europe: what an immense size then must the world be! It would take a day to travel from one end of England to the other by railway; but we could not travel round the earth in much less than three months at the same rapid rate.

We live on the land, but a much larger portion of the earth's surface is covered with water. However far we travel, whether by land or water, we never find any end to the earth, but can always travel onwards. We might, therefore, suppose the earth to be without end; but if

* Give name and † other particulars

we travelled on and on in the same direction, we should in time come to that part of the earth from whence we started. We hence conclude that the earth is *round*. The shape of the earth is much like that of an orange.

We cannot see over much of the earth's surface at one time: this is because we cannot get high enough. From a hill we can see but a few towns and villages, and from the highest mountain in England we can see over only a small part of the whole country: but if it were possible for us to go up in a balloon to the height of a thousand miles or so, we should then see the earth below us as a vast ball or globe.

We may be assured that the earth is of this globe-like or spherical form, by observing a ship when sailing towards us. While the ship is some few miles off, we can see only its topmasts, and the body of the ship then seems as if it were buried in the waters: but as the ship comes nearer to us, we see more of it, till at last all its parts are visible.

LESSON II.

THE SURFACE OF THE EARTH.

THE earth's surface is not generally even or regular. We see mountains and valleys as well as level plains. Some mountains rise to a great height, and the valleys are often very deep. In many parts the land is not seen at all, for it sinks so low as to be covered by the water. The water, being free to move, and following its tendency to flow downwards, has collected in the lowest parts of the earth's surface and thus formed seas and oceans. The higher parts of the earth, which remain uncovered by the waters, we call the dry land.

If the surface of the earth were even or level, it would not be fit for the abode of man. The waters would, in that case, spread completely over the earth; and if land were at all visible, it would be but swamps and marshes: also, if the waters were dried up, or were to *sink into* the vast plain, the earth would then become

a dry desert, on which neither plants nor animals could exist.

Without mountains and valleys also there would be neither streams nor rivers running from the higher to the lower ground. Thus, owing to the uneven nature of the earth's surface, the waters are collected in the deep places, while the upper parts of the land are dry and separate from the seas.

Hills and mountains are thought to have been formed by the force of intense heat acting from the interior of the earth: such fire is in action now, as may be seen in burning mountains and boiling springs. Earthquakes, by which the level of large districts has been greatly altered, and thus cities and towns destroyed, are believed to arise from the same cause. The immense force of this internal heat in old times upheaved vast rocks, and raised ocean beds to the upper parts of the earth.

Water covers nearly three-fourths of the earth's surface. This great quantity of water is very beneficial. More animal life can be supported in the sea than on the land, as the *surface* only of the land is available for living beings; whereas nearly all parts of the ocean contain fish and other living things.

If there were less water on the earth's surface there would be less rain; and a very large part of the earth would become too dry and parched to support either animal or vegetable life. As it is, there is enough moisture raised by the sun's heat from the waters of the earth to fall as rain, which not only refreshes and fertilizes the land on which it falls, but also forms streams and rivers which are so useful to man.

The waters of the earth also form an easy means of intercourse between different nations, and thus aid commerce. Ships can move very easily on the water, while the winds, which blow over the ocean, supply a force by which they are moved. Hence, the sea is a *highway* for nations, and people living thousands of miles apart from each other, have a cheap and ready means of communication.

This will help us to understand why the most noted places for commerce are situated on the sea-coast, or on rivers communicating easily with the sea. *London* owes its commercial importance to the river *Thames*, *Liverpool* to the *Mersey*, and *Bristol* to the *Avon*. *Hull*, *Plymouth* and *Yarmouth* are other examples of towns whose trade is owing to their nearness to the sea.

Many similar examples of foreign towns might be given; and *countries*, generally, owe most of their commercial importance to their means of communication with the sea.

The remaining portion—about one-fourth—of the earth's surface, is not covered by water, and forms the dry land. The land is of the greatest importance to man, as on it he lives, builds his dwelling, grows his corn, and obtains the greater part of his food. We have seen, however, that the portion of the earth's surface covered by water could not be much lessened without rendering the earth less fit as a habitation for man.

LESSON III.

MAPS AND GLOBES.

Most of us have seen drawings or pictures of places that we know. A picture of the inside of the school-room would show the walls, doors, windows, and desks, just as they appear to us: but we might also give an idea of the sizes and positions of these objects by *lines*

and *dots* marked at proper distances. The walls might be shown by long straight lines; the windows, desks, and doors, by shorter ones; and the stove or bookcase by a dot. This would be called a *plan* of the school-room.

In the same way we might make a plan of our parish, when the *roads* and *streets* would be shown by lines, and the houses and other buildings by small squares or dots. When the *coasts*, *rivers*, *hills*, *cities* and *towns* of a country are marked in this manner, we have, what is called, a *map* of the country. A map, therefore, is a *plan* or *drawing* of a tract of country.

The first thing we have to notice on a map, is the line showing where the land borders on the sea: this line is called the *coast*, and is very seldom straight or regular: it shows where the land stretches out to the sea, and where the sea runs in between portions of land.*

We may now notice several firm and rather crooked lines, which generally run from the interior of a country towards the coast. These lines mark the *rivers* and the winding courses they generally take. We may also

* The teacher should here use a boldly executed map for illustration.

see that these lines gradually become thicker, showing that rivers enlarge as they flow onwards. This increase is owing to their being joined by others in their course, and receiving smaller streams that have their rise near them.

Mountains are marked on maps by rows of short jagged lines, or by groups of dots. We may observe that most rivers *rise* near mountains, where the streams, being small, are represented by thin lines. Cities and towns are marked by small circles or large dots: the *name* of the place is also generally printed near to the mark which shows its situation.

We cannot tell the *real size* of a country by a map only, as the same portion of land may be shown on a large map or on a small one; just as the Queen's head may be shown by a large portrait or by a small postage stamp: neither the portrait nor the postage stamp will enable us to tell whether the head is large or small, but both of them help us to see the relative size of each part of the face.

The *whole* world is best represented by a globe, which shows the *shape* of the earth, the relative size, position and general form of all the larger portions of land and water.

As the whole world, which is so large, has to be shown on so small a thing as a globe, each country can have only a little *space* on it, and many smaller parts cannot be represented at all. It would be useless to look on a globe for the name of our parish, or even that of a small town or county. Yet *England* and other *countries* are large enough to be drawn on globes, and, therefore, may be easily found.

We cannot see every part of a spherical body at the same time, consequently we turn a globe round when we wish to see the opposite side. But if a globe were cut through its centre, the two halves thus formed might be so placed as to show the whole rounded surface at one time. Now, some maps represent the entire surface of the earth within two circles, somewhat as you would see it on the two half globes. These are called *hemispheres*, and this mode of showing the earth is known as the *Globular projection.*

At other times the whole world is represented on a flat surface, bounded by four straight lines: we see, however, that some parts must be shown out of their proper relative size; for, as you cannot flatten out the rind of an orange so as exactly to fill up an oblong

space, so neither can the surface of the earth be represented in this way without altering the proper size and position of some of its parts. A map of this kind is said to be made on *Mercator's projection.*

LESSON IV.

RELATIVE POSITION.

In describing the situations of objects we use the words *right* and *left;* we also speak of a *front* garden, a *back* door, an *upper* and a *lower* room: but in speaking of places on the earth, we use the terms *east, west, north,* and *south.* These *cardinal* points never change, and can be found out by the position of the sun. If, in the northern hemisphere, we look towards the sun at noon, our face is to the south, our back to the north, our left hand to the east, and our right hand to the west. The north is opposite to the south, and the east is opposite to the west.

We may now find out the north, south, east, and west parts of the school-room,* and point out the position of

* A useful exercise on the position of well-known buildings, streets, &c., may be given at the end of this lesson.

the doors and windows in regard to these *cardinal points*. We may then tell what parts of the town are to the east, what parts are to the west, and so on; and also the direction of the neighbouring towns and villages. We may then learn the relative position of other places; Greenwich we shall find on the east side of London, and Brentford on the west; Yarmouth is on the east coast of England, Liverpool on the west: Yorkshire is one of the northern counties, and Hampshire one of the southern. These facts we can easily learn from a map of England.

A map of Europe shows us the position of its different countries; we find France to the south of England, Holland to the east, Scotland to the north, and Ireland to the west. In the same way, with a map of the world, we can tell the position of any large portion of land or water.

Let us notice that large piece of land on the east of Europe called Asia, and another portion south of Europe called Africa; we shall see that Africa does not lie exactly south, or west of Asia, but about half way between those two points; we therefore say that Africa lies to the south-west of Asia, and Asia to the north-east of Africa. In the same manner we may

describe Australia as south-east from Europe, and Greenland as north-west from it.

The largest portions of land are called *continents*. On a map of the world we see a large mass of land, consisting of Europe, Asia, and Africa; this is called the Eastern Continent, or the Old World. To the west of this, and bounded on each side by a great ocean, stretches the Western Continent, consisting of *North* and *South America*. These two portions of America are connected by a narrow neck of land near the equator. America is called the New World, from its having been unknown to us until 1492, when it was discovered by the famous Columbus.

Besides these large continents, there is a mass of land to the south-east of Asia called *Australia*. It is quite surrounded by water, and is, therefore, an island. Together with several other islands, it forms one of the great divisions of the globe, and has been named *Oceania*.

A portion of land nearly surrounded by water is called a *peninsula;* this word *peninsula* means *almost an island*. Spain and Portugal are frequently called *the* Peninsula, because they together form the most noted portion of land of this description in Europe.

A narrow strip of land that joins two larger portions is called an *isthmus*. The isthmus of Darien, that connects North with South America, and the isthmus of Suez, that joins Africa with Asia, may very easily be found on a map of the world.

The largest masses of water are called *oceans*. The largest is the *Pacific Ocean*, which covers nearly one half of the earth's surface. The next in size is the *Atlantic Ocean*, lying between us and America. The water round the North Pole is called the *Arctic Ocean*, and that round the South Pole the *Antarctic Ocean*. There are also some other oceans, as the *Indian*, the *Southern*, and the *North Sea* or *German Ocean*.

LESSON V.

LAND AND WATER.

THAT part of the land next to the sea is called the *coast* or *shore*. Some coasts are low and flat, others are formed of lofty rocks or cliffs. The land immediately touching the sea is mostly a sloping bank. This bank is generally covered with pebbles, sand and shells, and is then called a beach.

The water, by its continual washing against the land, not only carries away the soft earth, but also gradually undermines and beats down pieces of hard stone or rock; these are still further broken by the waves, until they become the mere pebbles and sand of our sea shores. The shells, so common on some shores, have been the abodes of small animals.

The sea coast seldom proceeds far in a straight line, but bends and curves very frequently. The shape of the coast arises chiefly from the direction and force of the water currents that flow by it, and also from the kind of soil or rock of which it is composed. A strong and rapid current will carry away projecting pieces of soft earth, and will also in time wear away portions of hard rocks: while a slow turbid river will deposit mud brought from the higher ground by its small rapid streams, where it falls into the sea.

Many coasts are now undergoing changes from such causes. Thus, the soft clay and marl of some parts of the coast of Kent are gradually being washed away; while, on the other hand, the river Rhine is constantly carrying down earth from the central parts of Europe, and depositing them on the coasts of Holland and Belgium.

Those portions of land that stretch into the sea are named *capes, promontories*, or *headlands*. A portion of water, more or less enclosed between two projections of land, is called a *bay* or *gulf*. Projections of land tend very much to break the force of the wind and water, so that the waves do not dash about so strongly in bays as in the open sea. A bay that is pretty well sheltered in this way, and which has a good depth of water, forms what is called a *harbour* or *haven*. A harbour is of very great use to ships; as, when heavy storms come on, ships would be often tossed and dashed to pieces were they not able to run into such a place of refuge. We may thus see how a coast that is indented with numerous harbours is best suited for commerce.

We may notice that Europe has a good coast in this respect, whereas Africa has but few bays or harbours, and thus is not so well adapted for commerce. But no part of Europe has, for its size, so many excellent harbours as the British Islands. In this way we see that the *form* of a country has a considerable influence upon the occupations and character of its people.

In many places where a bay was not sufficiently protected against the force of the water, masses of

stone or wood-work have been placed to increase the safety of the harbour. The *Breakwater* at Plymouth is a noted example of an artificial shelter of this kind.

The natural productions of a country, as well as the employments of its inhabitants, depend greatly upon the character of its land. A mountainous district grows but little corn or other agricultural produce. There is very little fertile soil on mountains, as the soft earth is washed down by the rain. Mountains are consequently often rocky and barren. When, however, they are covered with herbage, they furnish subsistence for sheep and cattle. Vast numbers of sheep are fed on the South downs of England, on the mountains of Wales, and other hilly districts.

Valleys, plains, and moderately hilly parts are best adapted for agriculture; while the more mountainous regions are used chiefly for feeding sheep, and are also often famous for mineral wealth, and therefore become scenes of mining operations.

LESSON VI.

RIVERS.

COURSES of running water are so common that we must have often noticed them. Some streams are so small that we can step over them, while most rivers are sufficiently deep and wide for large ships to sail on. Small streams are called *streamlets, rivulets, or brooks;* while the larger water-courses are called rivers. Each river has its individual name, as the *Thames, Rhine, Jordan,* and *Amazon.* Some rivers of England are about two hundred miles long, but others in Asia and America are above one thousand miles in length.

If we observe a stream, we shall see that the water flows from the higher to lower ground. We may enquire, however, as to where the water comes from at first. The beds of rivers would soon become dry if there were not fresh supplies of water. After much dry weather, many brooks and springs become nearly dry, but after much rain, they are full again. It must

be the *rain*, therefore, that fills the brooks and streams. The streams which flow into any river are called its *tributaries*. That part of a river where it flows into a sea or lake is called its *mouth*.

Rivers seldom flow far in a straight line, but wind through sloping channels or beds. The whole country drained by a river and its tributaries, is known as the *basin* of that river. Water, from its own nature, flows downwards or tends towards the lowest levels. Any rising ground prevents the direct passage of a stream, it therefore winds *round* the base of a hill or other elevation that stands in its course.

Rain comes from the clouds. Clouds are nothing more than masses of watery vapour floating in the air.

But where does the vapour come from that forms the clouds? If some water be placed in the open air on a hot day, it will gradually become less in quantity, some of it being changed into vapour by the heat. In the same manner, the heat of the sun causes vapour to rise from seas, lakes, rivers, and from every damp part of the earth's surface exposed to its influence.

The air absorbs or takes up this vapour somewhat as a dry sponge absorbs water. The atmosphere is never

completely dry, but contains more or less moisture in an invisible state. We may see how vapour is absorbed in the air, by observing the steam as it issues from a railway engine. It does not ascend to a great height, but soon disappears, seeming to melt away to nothing. The *amount* of moisture that the air will receive and hold in an *invisible* state, varies according to its heat and weight.

The warm air, thus charged with moisture, rises, until it reaches a part of the atmosphere of the same weight as itself, where it floats about. In course of time, however, these vapours become cooled by coming into contact with currents of cold air, or from being carried near to the tops of mountains, and then the moisture no longer remains invisible, but forms itself into *clouds;* and when the air below is light or rare, these clouds discharge themselves, and we have *rain* or *snow.*

Most of the vapour comes from the large bodies of water called seas and oceans. How is it then that rain-water is never salt? The reason is, that the salt contained in the sea does not rise with the light particles of water that ascend in the form of vapour. So also

salt-water may be boiled, and its steam, when condensed, will be nearly or quite free from salt.

We thus see how admirably the air is provided as a great reservoir for the vapours drawn by the sun's heat from the waters of the earth; while at the same time, the changes to which it is subject, its varying amount of heat, the changes in its weight or density, its motions as wind, all unite in producing the refreshing rains whereby our springs and rivers are supplied with water.

LESSON VII.

MOUNTAINS.

We have learned that the earth's surface is very uneven and irregular; that there are hills and dales, mountains and valleys. The principal elevations of our country are towards the north and west. Some of the hills near London are about *two hundred* feet high, and you could easily walk to the top of one of these in about half-an-hour; but some of the Mendip and Malvern hills are *five times* as high as this. And Skiddaw and

some other mountains in the north-west of England are about three thousand feet high: while *Snowdon*, in north Wales, is above *three thousand five hundred* feet high, and *Ben Nevis*, in Scotland, is about eight hundred feet higher than Snowdon.

The mountains of Great Britain, however, are small compared with those of some other countries. The celebrated *Mont Blanc*, the highest mountain in Europe, is above fifteen thousand feet high; that is, above three times the height of Ben Nevis. But some of the elevations in the vast chain of the *Andes*, in South America, are more than *twenty thousand* feet above the sea level: and the highest of the *Himalaya* range, in South Asia, is, probably, not less than *twenty-nine thousand* feet high; so that travellers, who have seen these immense heights, speak of Mont Blanc as only a *second-rate* mountain.

Mountains differ, not only in height, but also in form and arrangement. Sometimes a single mountain rises from a plain: Arthur's Seat, near Edinburgh, and the Wrekin, in Shropshire, are hills of this description: the volcanic mountain Etna, which is ten thousand feet high, is the greatest *isolated* mountain in Europe. More generally, hills join one another and form groups,

or, if connected in a line whose length is much greater than its breadth, it is called a *range* or *ridge*, and several of these form a chain.

Along the south-east of England there is a range of hills called the *South Downs;* and in the west, the *Mendip* hills of Somersetshire, the *Malvern* in Worcestershire, and the *Snowdon* range in Wales, extend for some miles.

Some mountain chains are of vast extent and size. The *Andes* stretch along the entire continent of South America, and continue, with but few interruptions, along the greater part of North America, where they are called the Rocky Mountains. The Andes and Rocky Mountains form an almost continuous chain, about eight thousand miles in length, and is the longest chain in the world. But there are some other ranges above a thousand miles in length, as the *Himalayas* in Asia, and the *Atlas* mountains in Africa.

The mountain ranges are by no means regular, or of the same height in all parts, like the roof of a house. Some parts are narrow and steep, while in others there is a gentle ascent from the plain or valley below. The summits, in some cases, are sharp and pointed, and in

others rounded; some parts of a mountain chain are broad, having miles of elevated *table-land* near their highest parts. In many instances other ridges strike off from the principal chain, as branches from the trunk of a tree.

Mountains perform a very important part in relation to rain, rivers, and climate. They attract the clouds, which may often be seen clinging to the sloping sides of mountains. The clouds are thus collected and condensed, and hence more rain falls in mountainous districts than on plains. Part of this moisture soaks into the mountains, and thus *reservoirs* of water are formed, from which issue springs that seldom cease to flow.

You may also observe that the springs and rivers generally flow on the sides of the mountains contrary to the direction of the entire chain. In fact, the line of greatest elevation forms a dividing ridge for two sets of rivers, and is called the *watershed;* because it sheds, or throws off the water in two opposite directions, just like the ridge of a roof throws off the rains.

Mountains influence *climate* in various ways. The sunny side of a mountain is much warmer than its

other side. Places on that side will therefore partake of the greater warmth, and also be protected by the mountain, from the cold winds that come from the opposite quarter. In the *northern* hemisphere the *southern* slope is the warmest; and in our country, a place situated on a southern slope, with hills rising on the east, is very mild. In the south of Devonshire and the Isle of Wight there are many such spots, which are much frequented by invalids who require a warm atmosphere.

The climate is observed to differ on mountains at various elevations. Thus, in ascending a very high mountain near the equator, the same varieties of climate are met with as in proceeding thence to one of the poles. On many of these mountains the snow never wholly disappears, and that elevation beyond which the snow remains throughout the year, is called the *snow line*.

This line is highest near the equator, where it is about *sixteen thousand* feet above the sea level; while in parts, as distant from the equator as Britain, it falls to about *six thousand* feet. Even the mountains of Wales and Scotland retain the snow much longer than the plains and valleys below them.

Mountainous districts are much frequented for fresh air and beauty of scenery. Every one acquainted with mountain scenery has admired the extensive and varied prospect;—the streams that leap down the mountain sides, often dashing and foaming wildly along, and sometimes forming still lakes in the hollows;—the varied foliage,—the grand masses of rock—images of vastness and sublimity—all of which fill the mind with awe and reverence towards their great Creator.

LESSON VIII.

OCEANS AND SEAS.

THE greater portion of the earth's surface is covered with water. Most of this water exists in vast masses called *Oceans*, and smaller collections called *Seas*. The rivers and streams, though of vast value, form but a small portion of the great body of water that covers about three-fourths of the earth's surface. In sailing along a river, one can generally see the bank on each side, but on the ocean you may sail for weeks without coming in sight of any land.

The quantity of water on the earth seems to be wisely adapted to the wants of its plants and animals. If there were less water, there would be less rain, and many regions now fertile would become parched deserts. Again: if the oceans and seas were much larger, so great a quantity of water would be evaporated, which would afterwards fall as rain, as would change many pleasant plains and valleys into desolate swamps.

Rivers carry into the sea the solid matter which they obtain from the land through which they flow. Particles of mud and sand brought down by rivers, are, from their greater weight, *deposited*, and form mud and sand banks: but particles of *salt* are held by the water in *solution*, and therefore cannot be deposited in this manner. Neither do the atoms of salt rise with the vapour which is *evaporated* from the sea. Owing to the saltness of the ocean, the waters are more buoyant, and therefore better adapted for navigation; and at the same time its presence lessens the amount of ice formed on its surface. The ocean is not equally salt in all parts, being least so near the poles. This is probably caused by the large quantities of fresh water discharged by rivers in the equatorial regions, and the

melting of the snow and ice during summer in the polar regions.

The water of the ocean is mostly of a blueish tint; but this is greatly modified by a variety of circumstances. Thus, the sunshine, the passing clouds, sand-banks, and immense swarms of small animals floating in its waters, all tend to produce some difference of colour. Hence the sea is white in the Gulf of Guinea; while other parts are green, red, or purple.

The bed of the ocean is irregular, like the surface of the land. In many parts the ocean is very shallow, in others it is too deep to be fathomed. The average depth is supposed to be about *half a-mile*, though in some parts the depth is known to be above *five miles*.

All who have observed the sea must have seen that its waters are always in motion: wave after wave dashes upon the shore, and if the wind be high, the rolling and foaming billows present a sight of grandeur and awe. The wind is the chief cause of this *motion in waves*. The slightest breeze will produce a ripple on the face of the sea: while in a storm, the force of the wind raises the billows so that they are said to run mountains high, and then ships are sometimes de-

stroyed by their force. The highest waves occur in the Southern Ocean, where they are sometimes from thirty to forty feet in height. The sea is rough, not only during a storm of wind, but often for several days after it. The lower parts of the sea, however, are not so tossed by the force of the wind, being kept nearly quiet by the pressure of the water above.

The waters of the earth, in most parts, have a general onward motion. These are known as *ocean currents*, and are very extensive and various.

The waters of the Pacific and Atlantic Oceans, to the distance of about 24 degrees on each side of the equator, move in a slow majestic current from east to west, known as the *equatorial* current. About half way across the Atlantic this current divides into two portions, one of which flows southward along the coast of Brazil, while the other pursues a north-westerly course, and flows through the Caribbean Sea into the Gulf of Mexico.

In this gulf the water becomes very warm, and this, together with other circumstances, causes it to flow out with a far more rapid motion, forming that noted current known as the *Gulf Stream*, which, flowing

along the eastern coast of North America, may be traced quite across the Atlantic, when in time it reaches the coasts of Norway, the British Islands, and other western countries of Europe.

Some currents are caused by the melting of ice and snow in polar regions, while others are caused by the regular prevailing winds. Thus the monsoons produce several, among which is one flowing along the Coromandel coast, and is called the *Bengal current*, which flows to the north-east in summer, and to the south-west in winter.

LESSON IX.

THE TIDES.

THE waters of all the large oceans and seas are observed to rise and fall with more or less regularity in a certain time. This motion is called the *tide;* and we speak of it as being *high* or *low:* we also say that it *flows* and *ebbs*. This motion of the water of the ocean is communicated to most large rivers for some distance up their course: all such rivers are called *tidal rivers*. The

small springs and rivulets have no tide, but a constant current downward towards the sea. Most of our ports are at, or near, the mouths of rivers where the tides are felt. Ships are thus aided in coming to or going from them. In other ways the tides are of great value. Thus London, Bristol, Liverpool and Hull are upon tidal rivers.

But the water does not rise to the *same height* in all parts, the difference being greatest in small inland seas, bays, estuaries, and rivers. In the great central oceans the tides never rise more than a few feet. In the Mediterranean Sea the rise of the water is so slight as to be hardly perceptible, while in some wide-mouthed channels like the Bristol Channel, it rises as much as fifty or even sixty feet.

From the facts already stated, and others that have been observed in various parts, it appears, that on the two opposite sides of the earth, a large ocean wave is formed; that is, the water is raised a few feet above the general level, while between these opposite sides there is a corresponding fall in the water. Thus one-half of the water surface is raised, while the other half is depressed.

But these tidal waves do not remain stationary; they travel onwards round the globe, so that low and high water follow each other in succession. These changes take place twice every *twenty-five* hours: thus, if it were high water in the Thames, at London, at six o'clock in the morning, it would flow down for about six hours, then the tide *turns*, and after flowing up for about the same time, it becomes high water again at half-past six in the evening. It is also observed that the tides rise a little higher than usual a little after *new* and *full moon;* these high tides are known as *spring tides*.

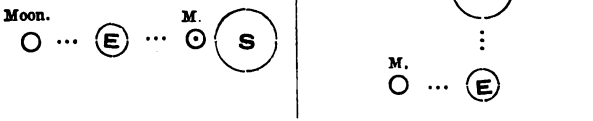
We must now consider *how* the tides are produced. It will be shown that the earth turns on its axis once every twenty-four hours. It is also known that the sun and moon *attract* or draw other bodies towards them. The water of the earth, therefore, being free to move, and being more strongly attracted by the sun and moon on that side nearest to these bodies, is drawn up so as to form the *tidal wave*, known as *high water;* while from the smaller amount of attraction, on the opposite and more distant side of the earth, the waters there fall back, and thus form another tidal wave. Owing to a motion which the moon has round the earth, these tides

do not recur at the same time, but nearly an hour later every day.

The tides depend much more upon the attraction of the *moon* than of the sun ; because, the former, being so much nearer to the earth than the latter, acts upon its *parts ;* while the sun, from its immense size and distance, principally exerts its influence upon the earth *as a whole.*

As at new and full moon the sun and moon are in a right line with the earth, these bodies then exert their influence *unitedly* upon the waters of the earth, and produce *spring tides ;* whereas, when the moon is in her first and third quarters, these bodies, being at right angles, exert their attractive force in *opposite* directions, and thus produce our *low* or *neap* tides.*

* This diagram shows the position of the earth, sun, and moon at spring and neap tides. The teacher will of course illustrate more fully by a larger diagram on a black board.



LESSON X.

THE SIZE, SHAPE, AND MOTIONS OF THE EARTH.

We have learned that the earth is a large globe, something like an orange in shape; that its surface is very irregular, having mountains four or five miles in height. We might at first suppose that these great elevations interfered with the roundness of the earth; but they are very small indeed, compared with its immense size. We do not think that the *roughness* of the rind of an orange causes it to be otherwise than *round;* and if the earth's surface were as irregular, compared with its size, as is the rind of an orange, the mountains would be ten times higher than they are.

The world is so very large that a line drawn round its outside would measure nearly 25,000 miles: this is called the *circumference* of the earth. A line from one side of the earth, passing through its centre to its opposite side, would be nearly 8,000 miles in length: this is called its *diameter*.

We usually speak of the earth as a globe or sphere:

it is not, however, an *exact* sphere, being slightly flattened at the poles, and is therefore called a *spheroid.* This arises from its rapid motion on its axis, causing the parts at the equator, which move most quickly, to bulge out; while the parts at the poles, having scarcely any motion, are depressed or flattened. We see an illustration of this as we twirl a mop round, to dry it: the water flies off chiefly from its central parts. Portions of the earth would, in like manner, fly off from the equator, were it not for the great *attractive* force of the mass of the earth, which not only keeps all its parts together, but even prevents the light atmosphere on its surface from flying off into space.

This motion of the earth on its axis is, at the equator, at the rate of 1,000 miles an hour, and has caused those parts to swell out about thirteen miles beyond the exact spherical form: while the parts at the poles have become flattened to an equal extent. Hence, the length of the earth's axis, that is its polar diameter, is twenty-six miles less than that of a similar line drawn through its centre at the equator.

The earth is usually represented by a globe on which the chief portions of land and water are shown. The

lines of *latitude*, that is, the distance *north* or *south* of the equator; and the lines of *longitude*, or, distance *east* or *west* of any given place, are also marked. There are no such lines on the earth itself, but it is very convenient to have them marked on globes; as, by them, we can describe the situation of any place otherwise unknown. Thus, when a traveller says that he found a town, lake, or river in any given latitude and longitude, we can easily find it on a globe or map.

Vienna, in Austria, is in *east* longitude, for it lies east of London, from which the English rekcon their longitude; and America is in *west* longitude. Australia is in *south* latitude, while we are living in *north* latitude.

We have all seen the sun rise in the east, pass over the heavens and set in the west: and in like manner the moon and stars *appear* to move round the earth, for they rise and set too. We must now consider *how* these appearances are caused.

When floating in a boat along a river, or travelling on a railroad, the trees and other near objects *appear* as if they are either flying toward or from us. We *know* that *we* are *moving* along, but what we see is, as though the *trees* were in motion. We thus learn

that we must not trust to our sight alone in the matter, and are prepared to learn that the sun, moon, and stars do not revolve round the earth day by day as they appear to do, but that the motion is in the *earth*, which turns or *revolves* upon its axis *daily*, and thus causes the regular succession of day and night.

Still, it may appear hardly likely that so large a body as the earth should revolve in so short a time. We do not *feel* the earth move, nor see anything powerful enough to put it in motion. We will explain this difficulty. All the objects on the surface of the earth partake of its motion and move with it. We can, therefore, judge of this motion only by that of the heavenly bodies; and, from what we see, we are quite sure, either that the earth revolves, as we have said it does, or that the whole of the heavenly bodies move round our earth.

The sun is known to be ninety-five millions of miles from us, and the fixed stars are still more distant, some being farther off than we can calculate; so that if these bodies revolve about the earth, they must move with such amazing rapidity as would completely scatter the matter of which they are composed. The earth's mo-

tion is such, that a place at the equator travels a thousand miles an hour; but if the sun revolved round the earth it must move at the rate of *twenty-five millions* of miles an hour, and the stars would have to proceed at a still more rapid rate: and not only so, but they must all daily complete their varied circuits at precisely the same moment of time.

Now these are far less reasonable conclusions than that the earth rotates upon its axis. In fact, it is as unlikely than an *Allwise Creator* made the sun, moon, and stars revolve round the body they supply with light and heat, as it is that a *wise man* would make a fire and grate move round a joint of meat to roast it.

The earth has another motion in space, but that will form the subject of another lesson.

LESSON XI.

THE EARTH'S ANNUAL MOTION.

We have read of the earth's motion on its axis, whereby *day* and *night* are caused. We have now to consider how the *seasons* are produced. We have spring, summer, autumn, and winter, following each other in regular order. Similar changes, however, do not occur on all parts of the world. In the polar regions, there is continuous sunshine for half the year; while during the other half the sun never appears. This very long day, of not less than six months, constitutes the summer of the polar regions; and the equally long period of the sun's absence, is the winter of those parts.

At the equatorial regions, however, nothing like our winter or *cold* season is ever felt. The year, in these tropical countries, consists only of the wet and dry seasons. It is, therefore, on those parts of the earth between the polar regions and the torrid zone, that the seasons, such as we experience, occur.

If you observe the sun rise or set for several days

following, you will see that he does not always rise exactly in the same part of the heavens, and that similar changes occur in respect to his setting: in fact, the sun's entire path in the heavens varies a little daily. In winter, we may observe that his course is shortest, and even at mid-day he is not very high in the sky: but in summer, his path is much longer, and then at noon we may see him nearly overhead. On the twenty-first of December, which is our shortest day, the sun rises at eight o'clock, and sets about four. The days then become gradually longer until the twenty-first of June, when the sun rises before four o'clock in the morning, and does not set till past eight in the evening. The days then shorten till the twenty-first of December. There is thus a difference of nearly nine hours in the length of the longest and shortest days.

It is quite clear that more of the sun's heat will be received at any part of the earth during a long day than during a short one. Thus, in summer, the air, earth, and waters of our country obtain more heat during the day than they part with during the night; and hence the heat goes on increasing till some time

after the longest day; then as winter approaches, the earth and air *lose* more heat during the long nights than they receive in the short days, and thus cold increases at that season.

We have also seen that, in summer, the sun is not only above the horizon for a longer time each day, but also that it gets more nearly over our heads at noon. In this position its rays give more heat than when shining obliquely. A greater *quantity* of heat is received by any space on which the sun shines perpendicularly, or nearly so, than by an equal space on which the rays fall in a slanting direction. More drops of rain (falling perpendicularly), will be caught on a slate held in a level or horizontal position than if held in a sloping or oblique direction. Thus the warmth of our summer results from the *directness* with which the sun's rays fall upon our land, together with the greater *length* of the *days* at this season. The coldness of winter, of course, arises from the reverse of these conditions.

We have already shown that the *daily* course of the sun in the heavens, is *apparent* only; so, also, the *yearly* path which the sun appears to take in the heavens is

only *apparent* likewise, being caused by a *real* motion of the earth. Astronomers tell us that the earth moves round the sun in 365¼ days, and in a nearly circular path or *orbit*

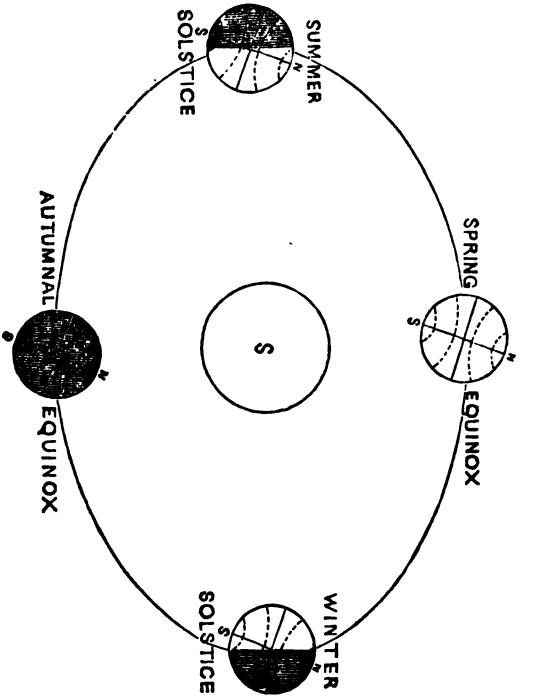
The earth, as it moves round the sun, has its axis always inclined to the plane of its orbit. This we may understand better by moving a ball or orange, round on a table near its edge. The top of the table would be the plane of the orbit, and the course or path which the ball moved through would be the orbit. A lamp placed on the centre of the table would represent the sun. Now, the ball as it moves round the lamp represents the *yearly motion* of the earth; and if it be also kept turning upon an axis, or line through its centre, the twirling motion would represent the *daily rotation* of the earth.

It could also easily be seen, by spots on the ball, whether it moved with its axis perpendicular to the top of the table,—that is, to the plane of the orbit,—or whether it had its axis in a slanting or oblique position. Now, the earth moves round the sun with its axis thus inclined to the plane of its orbit, only *always in the same direction*, the amount being 23½ degrees, or rather

more than one-fourth the distance from the perpendicular to the horizontal.*

As the earth moves round the sun with its axis thus inclined, at one time the northern hemisphere is brought so as to receive more of the sun's rays than the southern hemisphere: it is then summer in the northern, and winter in the southern hemisphere. This we may easily illustrate by our ball or orange, through which we may run a piece of stick to show the axis. By moving the ball to the opposite side of the table, we shall see that the other pole and hemisphere, representing the southern part of the globe, will receive most light, and the northern pole will then be completely hidden from the sun. Then, of course, it will be summer in the southern and winter in the northern hemisphere. It may also be shown, that in the two midway positions, all parts of the globe would have equal day and night, which is the case on the 21st of March and September.

* Full explanations, with *illustrations*, by the teacher will be here of great advantage.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LESSON XII.

THE AIR.

THE most important thing *connected* with the earth, is the air we breathe. We might live for a short time without food or light, but if we were deprived of air, in less than a minute we should cease to exist. The air is as necessary to other living creatures, and plants, as it is to man. The earth, indeed, would be very different from what it is, if not surrounded by its beautiful atmosphere. "The air, not only helps to lighten and warm the earth, but it is as a swaddling garment to *keep in* the heat of the earth and prevent it from being carried off into the void spaces of the universe. It likewise helps to cleanse the earth by its circulation as wind. Then, it promotes vegetation, carries water from the sea to the thirsty land, and from the tropics to the poles. It furnishes much of the food of plants,—their means of life and growth. Again, it is a most important instrument for the service of man: through this atmosphere, we enjoy light and sound;

without it all would be dark, dumb, and motionless; not a bird could sing or fly, not a cricket creak to his partner at night, not a man utter a word; and a voiceless ocean would ebb and flow upon a silent shore. Man kindles his fire by the air: it moves his ship, winnows his corn, fans his temples, carries his balloon."*

The first thing we may notice respecting the air, is *its abundance.* It extends to the height of more than forty miles above the earth's surface, though the highest parts are extremely rare or thin. It is most dense or heavy near the surface of the earth, and gets lighter as we ascend. People find this out when they ascend to the top of high mountains, or go up in balloons; they then breathe less freely, on account of the thinness or rarity of the air. The air is densest at the earth's surface by reason of the upper particles pressing upon the lower. At a great height, the air, having fewer particles pressing upon it, is much less dense than near the earth's surface, which is pressed upon by all that is above it.

When we feel the air moving, we say the wind blows: the atmosphere is never perfectly still, even in what we

* Slightly altered from an American author.

call a complete calm. The movements of the air are chiefly owing to *heat*. As the sun warms any part of the earth, the air of such part, partaking of the warmth, *expands* or presses outward in every direction : the warm air, thus expanded and made *lighter*, *ascends*, and the cooler air rushes in to supply its place. This accounts for the general current that blows towards the equator from the north, and also from the south. The earth, being a sphere, as it turns on its axis from west to east, *moves more rapidly at the equator*, and less rapidly in parts nearer the poles, where this motion ceases. Now, the winds, blowing towards the equator, partake of the motion of the parts of the earth from whence they proceed ; and, as this motion is less rapid elsewhere than at the equator, the currents of air from the north become north-east, and those from the south, south-east winds, blowing towards the equatorial regions. These winds are so regular, that mariners can depend upon them as they sail over the great oceans ; and, being thus very advantageous for commerce, they are called *trade winds*.

There is another circumstance connected with these great equatorial currents that we must try to under-

stand. At noon, on our midsummer day, the sun is not directly over the equator, but above 1,500 miles to the northward of it. The currents then blow from the equator to the warmer parts directly under the sun's influence: these currents, partaking of the rapid motion of the equator, move more quickly westward than the parts of the earth to which they blow, and therefore become south-west winds. In the same manner during our winter,—and when, of course, it is summer with all countries south of the equator, there is a north-west wind blowing from the equator to those parts of the southern hemisphere more directly under the sun.

As the air in tropical regions is very much rarified, that is, made lighter, by the sun's heat, we may expect that strong winds will be common in such places. This is so much the case that fearful hurricanes, rushing along at the immense rate of a hundred miles an hour, often sweep over these countries, tearing up trees and destroying all before them. We never have such winds in England: our strongest winds seldom exceed forty or fifty miles an hour. Winds are much influenced by the nature of the regions over which they blow. A wind coming from a hot sandy

district, will be warm and dry, while a wind blowing over a bleak marshy country, will be cold and moist. Thus, the east winds that prevail in England during spring are cold, dry, and piercing, from having passed over the extensive cold plains of the north of Europe: our western breezes, on the contrary, coming from the Atlantic, are warm, balmy, and moist.

People visiting the sea-coast in summer, often notice that a *sea-breeze* usually prevails during the day, and is succeeded by a *land-breeze* at night. This is owing to the land, during the day, becoming much warmer than the water, and a breeze therefore sets in from sea. At night, however, the land rapidly cools; while the water, being a less perfect conductor of heat, parts very slowly with the heat it has acquired: the land, therefore, at night becomes cooler than the water, and a breeze then blows from the land to the sea.

LESSON XIII.

CLIMATE.

THE term *climate* relates to the amount of warmth and moisture in the air of any place or country.

England has a *temperate climate*, while that of India is *hot*, and that of Lapland *cold*. These three terms, *hot*, *temperate*, and *cold*, express the three great divisions of climate. The differences of temperature, met with in different countries, are chiefly owing to the positions that these various parts of the earth occupy with regard to the sun, as the source of light and heat.

The sun, as we have seen, shines most directly over the parts of the earth at the equator, and most obliquely over the poles: the equatorial countries are consequently the *warmest*, while the polar regions are the *coldest* parts of the earth's surface. The lands that lie about midway between the equator and either pole, have a *temperate* climate.

The great belt of the earth's surface, that extends $23\frac{1}{2}$ degrees, or about 1,600 miles, on each side of the

equator, has been named the *torrid zone*, on account of its receiving so much of the sun's heat. The region that extends from the north pole, as a centre, to the distance of 23½ degrees, is called the *north frigid zone:* a similar region round the south pole is called the *south frigid zone.* These zones are called *frigid* on account of their coldness. The two regions between the rigid and torrid zones are called *temperate zones.* These temperate zones together form the largest and most important part of the world, and are best adapted for the comfort and progress of man. The north temperate zone is in the northern hemisphere, and the south temperate zone on the south side of the equator.

We may, therefore, know something of the climate of a country by its *latitude;* that is, *its distance from the equator.* There are, however, some other circumstances that modify the climate; the first of which is, *the elevation of the land above the sea level.*

The tops of high mountains are always cold. In the warmest latitudes the snow never melts at the height of about 16,000 feet. Elevated districts are therefore cooler than the valleys below them; and places even in the torrid zone, if very much above the

sea level, are cool. This is the case with Quito, in South America. This city, situated on a table-land of the Andes, is nearly 10,000 feet above the level of the sea; and, although just upon the equator, yet it has, on account of its elevation, a climate as mild and cool as our finest spring weather. Such places, being so much above the general surface of the earth, receive much less of the heat reflected from the earth, than is felt on the lower plains and valleys. It is this heat that is given off from the earth's surface, as well as the *direct* rays of the sun, that produce warmth of climate.

The sea, also, has great influence on the climate of a country near to it. Water being a slow conductor of heat, its temperature is not so rapidly raised as is that of the land, but it retains its warmth for a longer period. Places near the sea, therefore, when the hot days of summer set in, are refreshed by the cool breezes from the water; and in winter, when the land has become cooler than the water, the severity of the season is lessened by the mild air from the sea. Edinburgh, for example, is in about the same latitude as Moscow; yet Edinburgh, from its nearness to the sea, has a much milder climate than Moscow, which is situated in the

midst of a large continent. In fact, the cold at Moscow is as intense as it is on the coast of Norway, fifteen degrees, or one thousand miles, further north. The Cape Verde Islands, again, though within the tropics, have a mild and delightful climate, while the parts of Africa of the same latitude are extremely hot.

Ranges of mountains have also considerable influence upon the climate of places near them. More heat is received on the sunny slope of a mountain than on the other side. A mountain range shelters the districts on its sides both from the warm and cold winds. Thus, the Italian or south side of the Alps is much warmer than the northern; and the vale of Cashmere, on the south of the Great Himalaya range, has a warm and delicious climate, being well sheltered from the cold northern winds; while the countries on the northern side of the Himalayas are cold and bleak. The Atlas mountains, in Africa, also, have great influence on the climate of both Europe and Africa, by screening the former from the hot blasts of the African deserts, while they also attract and condense the moisture from the Mediterranean that might otherwise fertilize those vast desert regions beyond.

Winds have a considerable effect upon the climate of a country. Whenever a portion of the earth's surface becomes warmed by the sun's rays, currents of air set in, from the colder to the warmer parts. The wind thus, to a great extent, equalizes the temperature, and whenever it blows, it is bringing warmer or colder air from one district to another. The east winds, that are very prevalent in our country during spring, having passed over the great plains of Russia and North Germany, are cold, dry, and piercing; while the west winds from the Atlantic are warm and moist. In countries where regular periodical winds occur, the climate is generally regular, both in regard to warmth and rain; while in countries in which the winds are uncertain and irregular, like our own, the climate is variable.

The natnre of the *soil* has also some influence on temperature. A loose or sandy soil receives much more of the sun's heat than a compact, or clay soil. Damp marshes and forests are colder than dry and open portions of country. The temperature of a country is raised by the cultivation of the land; for thus the sun's rays can more easily penetrate into the soil.

LESSON XIV.

ON SOILS.

We are very familiar with the *soil*, *mould*, or *earth*, as it is sometimes called, on which our trees and plants grow. The whole surface of the land, however, does not consist of this soil or earth. There are rocky plains, sandy deserts, and peat bogs, as well as the vegetable mould of our fields and gardens. This soil, though so common, is by no means a *simple* substance, but is generally composed of several materials, differing very much in their nature.

If we take a handful of mould from a garden or a corn field and examine it, we shall first find a few small stones that we can easily pick out. If we then put the remaining earth into a jar of water, we shall see that the water becomes discoloured: this will be caused by some of the substances of the mould mingling with the water. We may even *see* fine particles floating about in the water. These fine particles that discolour the water consist chiefly of *vegetable* and *animal* matter.

The water will also have taken from the mould some *salts* and such substances, that are easily dissolved, and which we cannot *see* in the water, but which a chemist could detect very readily. There will still remain a portion of our handful of earth that mingles very slowly with the water. This substance we shall find to be *clay*. Other parts of the mould will not mix with the water at all, but will remain at the bottom of the jar. This *sediment*, we shall see, consists of grains of sand, some fine and some coarse, and chalk. Thus, *sand*, *clay*, *salt*, *chalk* or *lime*, together with the remains of decayed vegetable and animal matter, called *humus*, are the chief substances that make up the soil. All these materials are more or less abundant on most parts of the earth's surface.

Now, it is the mixture of most or of all of these substances, in different proportions, that constitutes differences of soil. In some places there is an abundance of *chalk*, as in limestone districts: in other parts *clay* prevails, as near London, and in many parts of Kent. Some soils are very sandy; and there are parts where the surface of the earth consists entirely of sand, in which no vegetation is found.

Now, God has provided plants for almost every kind of soil, as well as for almost every variety of climate. The nettle grows only in mould that is rich in animal remains; while the heath flourishes best on a light, sandy soil, in which many plants would perish. The mallow and dock send their roots deep into the earth; but the stonecrop and wallflower will grow on old walls. The watercress and bullrush grow in the water; while the cactus and pepper-plant require scarcely any moisture.

Most of the plants, however, that are of the greatest utility to man require a mixture of the different materials that form the soil. Wheat, for instance, grows best on a strong clay soil, in which there is a considerable portion of sand, chalk, and *humus*, which is furnished by manure. The sand and chalk, not only help to render the clay porous, and enable the fine fibres of the root to penetrate into the earth, but the plant itself, especially the stalk, requires a great portion of *silicious* or flint-like matter, which the sand supplies. A piece of straw contains a considerable quantity of this flint, which it derives from the soil.

From this, we may understand why farmers attach so much importance to the soil they have to cultivate: and

why a great deal of thought is required to grow crops best adapted to each particular kind of earth. Thus, agricultural operations differ very much in different parts of a country. If we travel through the south eastern parts of England, we shall find plentiful crops of the various sorts of corn. Kent, Essex, Sussex, Hampshire, Suffolk, Norfolk, Herts, Bedfordshire, and Berkshire, are all corn-growing counties. When we come to the south-western counties—as Devon, Dorset, Somerset, and Gloucestershire—we find less corn, but more pasture-land. Again: on the hill-tops and mountain-slopes of all parts of England we may see sheep feeding; this being the most profitable way of using the hilly parts on which herbage grows.

When the soil is suitable for particular kinds of crops, other matters—such as climate and moisture—must also be taken into consideration. It is chiefly in consequence of the south-eastern parts of England being less moist than the western parts, that corn is more generally grown in the former counties; while fields for pasture are more common in the west. Again: in the north of Scotland the climate is too cold for wheat; and oats are therefore more commonly grown, as they do not require so much heat to ripen them.

LESSON XV.

DISTRIBUTION OF VEGETABLES.

No one can help feeling wonder and delight at the *beauty*, *variety*, and *extent* of the vegetable kingdom. Flowers charm us all: they are so beautiful, "that even Solomon, in all his glory, was not arrayed like one of these." How refreshing it is to see the green meadows, the noble trees, and varied shrubs. If we observe carefully, we may find hundreds of different sorts of plants in a single field or hedgerow. Every individual plant, too, is so perfect and beautiful that each part of any one of them would well repay the most careful attention.

The wonderful *abundance* of the vegetable kingdom is no less remarkable. Not only is the *land* covered with trees, shrubs and flowers, but the *waters*, also, teem with vegetable life. The sea has its algæ, or sea-weeds; the lakes and rivers their rushes, lilies, and other water-plants. The crevices of rocks and walls of old buildings are adorned with delicate mosses, ferns, and other minute plants; and even the snow-covered plains of the polar regions are not wholly devoid of vegetation.

Every part of the earth, besides having some plants in *common* with other districts, has also its own *peculiar* productions: and each tree and flower has its special or native locality. No plant, however, will flourish in a climate or soil unsuited to its nature. The wallflower will not grow in ponds, nor the water-lily on rocks: the fir-tree will not live in tropical climates, nor the palm in cold regions.

The most important condition that regulates the distribution of plants is that of *temperature;* but there are also extremes of *drought* and *moisture* beyond which each kind of plant, according to its nature, will not grow.

In the hot tropical regions vegetation is most luxuriant. Lofty trees tower upwards above a hundred feet in height, their stems being often covered with creeping plants to the very top; and so dense with trees and herbage are many parts that they are almost impenetrable. Here the *banana* or *plaintain*, the *bread-fruit* tree, the *yam*, *date-palm*, *cocoa nut palm*, the *manioc* or *cassava root* (from which tapioca is prepared), and many other trees and shrubs, grow luxuriantly; the fruits of which furnish a plentiful supply of cool and refreshing food. The trees, also, by the large and spreading cha-

racter of their foliage, afford shelter from the scorching heat of the sun. A leaf of the *fan-palm* has been known eighteen feet across; and Humboldt, the great traveller, tells us of an American plant, the flowers of which are so large as to be used by the natives for hats; and a *banyan* tree is described as large enough to give shelter to seven thousand persons. The *clove*, *nutmeg*, and other *spices* grow principally in the islands of the Indian Ocean.

In those parts of the torrid zone bordering on the temperate regions, the *sugar-cane* is found. It is grown extensively on both continents, as well as on many islands of the great central oceans. The *bamboos*, which grow along the banks of the rivers in these regions, are often of very great height. These parts, also, have many nutritive plants—as *maize*, or *Indian corn*—which yields an enormous produce. *Rice* flourishes in this part of the torrid region, as well as in the warmer parts of the temperate zone, and furnishes subsistence to the majority of mankind, it being the common food of millions of Chinese, Hindoos, and Japanese. The *tea shrub*, *coffee tree*, and *tobacco plant*, are all grown in these climates: while from the

mahogany tree we get the hard and beautifully-grained wood used so much in making our furniture. Other plants supply us with *cotton*, *indigo*, *india-rubber*, *gutta-percha*, and many other useful products.

In the warmer parts of the temperate zones we come to the region of the *olive* and *vine*. The former suffers from extreme heat as well as cold. The vine will bear more cold than the olive; but it will not ripen in a latitude beyond that of the central parts of France. The countries of South Europe, bordering on the Mediterranean, produce these and other fruits—such as the *orange*, *lemon*, *fig*, and *mulberry*, in great abundance. Timber trees—such as the *chestnut*, *beech*, *elm*, *oak*, and several others—flourish here as well as in the still milder parts of the temperate regions.

We now come to countries having a medium temperate climate, like our own, where we find *wheat* growing in great perfection, and forming the staple article of food. This plant has a wide range of growth, extending from the shores of the Mediterranean (where it is believed to have grown originally in a wild state), to the central parts of Scotland. *Oats* and *barley* will endure greater cold than wheat, and are much grown in

Ireland, Scotland, and Norway. *Rye* is another of the *cerealia*, or bread-making plants, of temperate climates. The *fruits* of these temperate regions are varied and of good flavour. But no plant is more generally diffused, and better adapted for food, than the *potatoe:* it is a *native* of South America, but is now grown in most parts of the world. The *flax plant* (from which our linen fabrics are made), and *hemp* (the material for sacking, sails, and other coarse goods), are grown in the cooler parts of the temperate zone.

As we approach the frigid zones, we come to the region of *pines* or *firs*. These trees grow rapidly, and yield a large amount of valuable timber. Norway, Sweden, Russia, and the colder parts of North America, supply us with vast quantities of deals, tar, and turpentine, obtained from their immense forests of pines. The *birch* extends still further toward the poles; but it becomes stunted, and finally gives place to the *bramble* and *dwarf willow* of the Arctic regions. Here vegetation is very limited, consisting chiefly of *mosses* and *lichens*, which furnish food to the reindeer and a few other animals that live in these cold climates.

LESSON XVI.

ANIMALS.

We all know that our *own country* contains a large number of useful land animals. The *horses* that draw our loads, the *sheep* and *oxen* that supply us with food, the *asses*, *goats*, *dogs*, and *rabbits*, are *all* too well known to need description. In the woods and moors of the country, also, may be seen the *hedgehog*, *squirrel*, *mole*, *hare*, and *fox;* while the various kinds of *birds* are so numerous, that, in summer, the groves and forests are vocal with their songs. The streams, rivers, and surrounding seas contain swarms, not only of *fishes*, but also of various forms of animal life, some of which are so curious as to have puzzled our forefathers to determine whether they were really animals or plants. Our *insects*, too, though so small, are full of beauty—marvels of wise and skilful adaptation of means to the end proposed.

The distribution of animals, like that of plants, seems to depend greatly upon *climate*. The *lion*, *tiger*, and *giraffe* are found only in *warm* climates; whereas the

polar bear and *reindeer* are confined to *cold* regions. Many birds, however, guided by a beautiful instinct, by means of their great powers of flight, enjoy throughout the year, a climate best suited to their nature and habits. Thus, the *cuckoo*, *swallow*, and some other birds, leave Britain in the autumn for the warm shores of the Mediterranean, or some such genial clime. Other species, again, come from the severely cold regions of the north to enjoy our milder winter.

Some animals—as the *bear*, *dormouse*, and *bat*—*hybernate;* that is, they pass that portion of the year when their food fails in a state of sleep.

We find that animal life is most abundant in the warmer parts of the globe. The eggs of birds and reptiles may be hatched by the heat of the sun. In spring and summer, myriads of insects, and creeping things innumerable, are brought into being. From travellers, who have visited the *torrid* regions of *Asia* and *Africa*, we learn that the plains and forests of these continents are trod by the *elephant*, *rhinoceros*, and *camel;* that the *buffalo*, *antelope*, and *giraffe* may be seen in vast herds, many of which become the prey of the *lion*, *tiger*, *panther*, and other flesh-eating animals.

The rivers, too, have their *crocodiles* and *caymen;* and the largest kinds of birds—the *ostrich*, *emu*, and *cassowary*—also belong to these regions. In the same latitudes of the New World, although several of these animals are absent, yet species, having many similar qualities, take their place. Thus, the *puma* of America takes the place of the *lion* of the Old World, the *llama* that of the *camel*, and the *alligator* that of the *crocodile*.

The *insects*, also, of tropical regions are both large and numerous. Thus, the *white ants* of Africa are as large as our *bees;* and the *moths* and *butterflies* are many times larger than any found in Great Britain. The seas, also, abound with such millions of minute *radiated* animals, that, in the Red Sea and Indian Ocean, extensive reefs and islands have been formed by them.

We may now notice, that, just as vegetables depend for their growth upon *soil* as well as *climate*, so, each species of animal, also, is found to co-exist with its most suitable food. Thus, the abundant vegetation of the torrid zone supports the large vegetable-feeders already named: these, again, become the prey of lions, tigers,

and leopards; while the hyæna, vulture, and a vast number of reptiles and insects, feed upon such portions of *dead* animals as may have been left undevoured by the more noble of their race; and thus, the air is preserved from becoming impure, and a source of disease and death.

The animals of *temperate* climates, although far inferior in size, are of much greater value to man. Here, vegetation being less abundant, fewer animals are provided to partake of its supplies; and these, to a large extent, are of such a kind as repay the bounty of which they are first the partakers. The *ox*, *sheep*, *horse*, *goat*, and *dog*, although not *confined* to the temperate region of the earth, are found there in greatest numbers, and, being capable of domestication, are of great value to mankind. There are also few animals, if any, that have a wider range of locality than these useful quadrupeds. In the still colder regions, where the herbage becomes more scarce, there a kind Providence has provided the *reindeer*, which, during life, draws the sledge of the poor Laplander, and afterwards supplies him with his most important articles of food and clothing.

The cold polar regions contain but few animals. On

the land, various fur-covered quadrupeds are found—such as the *ermine*, *sable*, *musk ox*, and *lemming*. The *polar bear*, *seal*, and *walrus* are also met with amidst the ice and snow of these regions.

LESSON XVII.

ON MAN.

It is well-known, that although animals and plants of some kind are found in every variety of climate, yet that they differ greatly in their nature and habits. *Man*, however, is found throughout *all* regions. Some *Africans* live in a climate where the heat is sufficient to boil spirits of wine, while the *Esquimaux* are exposed to a cold so intense as to freeze mercury. The *reason*, with which man is endowed, and that wonderful organ, the *hand*, greatly enable him to adapt himself to the climate in which he lives; thus, he erects a tent or hut to screen himself from the heat of a tropical sun, or builds a substantial house to protect himself from the chilling blasts. He clothes himself with fur to resist the

cold, or with light cotton to intercept the rays of the sun. He obtains warmth, or prepares his food, by a fire of wood or coal, and in a variety of ways makes all things minister to his comfort.

Man is also capable of living upon *several sorts* of food. We eat *bread* made of *corn*, *potatoes*, and other *roots*; *fruits* and *herbs* also form part of our diet, while *flesh* of some kind is generally part of our daily meals. The adaptation of the teeth and other organs to such a variety of food, shows plainly that man was intended to inhabit almost all parts of the earth.

In *hot climates*, man lives chiefly on cooling *fruits* and *herbs*, animal food being neither plentiful nor inviting. On the other hand, people of very *cold countries* eat and relish little else than *animal food*. To endure great cold, *fat* and *flesh* are requisite, as these produce the largest amount of animal heat; and thus the Laplander and Esquimaux feed not only upon the milk of the reindeer, but also upon the fat of the seal, walrus, and other arctic animals. In temperate regions man enjoys both kinds of food, and, in general, his health is best sustained by a *mixed diet*.

Some parts of the earth, however, are more suitable

for man's comfort and welfare than others. A very cold temperature, though endurable, is by no means agreeable, and extreme heat produces a feeling of weakness and desire for repose. The absence of winter in these parts, together with the ready and abundant supply of food, render unnecessary any large amount of labour, forethought, or intelligence. All these influences tend to make the inhabitants of the torrid zone indolent, careless, and self-indulgent. In very cold climates, too, where the earth yields but little food even after severe toil, men have to labour so much for the common necessaries of life, that they have little time for any higher kind of occupation.

In temperate climates, however, there is *sufficient* warmth to ripen the fruits of the earth, and thus repay man for his labour, while the heat is *not so great* as to render that labour either *unnecessary* or *irksome*. The changes of season also promote habits of observation and forethought: men see that they must "make hay while the sun shines," and take advantage of summer to provide for winter. With the necessity for, and reward of, labour, men provide for their comforts; and the habits of prudence, industry, and energy, thus fostered,

produce a degree of prosperity and advancement in the arts and sciences, as well as in the common comforts of life, unknown in other parts of the world. Thus, the most *enlightened* nations are situated in the temperate parts of the earth, while the inhabitants of extremely cold and hot regions are far less advanced.

Notwithstanding the great differences that exist in the form and condition of men in different parts, yet all belong to the *same species*, and are descended *in common* from the *same first parents*. From a careful study of the colour, forms, and languages of men in various parts of the world, they have been grouped together into five varieties, which are commonly spoken of as the *five races of mankind*.

The inhabitants of our country, together with those of Europe generally, the greater part of Asia, and the north of Africa, belong to the *Caucasian race*. We are all quite familiar with the round head, arched forehead, oval face, and generally well-proportioned features of this race. A large and very important part of them have fair skins; but some, as the Arabs and Hindoos, are of a dark complexion.

Men of a very different stamp are met with in Lap-

land, Greenland, China, Japan, and other eastern parts of Asia. The heads of these people are nearly square, their cheek bones project, the nostrils are narrow, the face is broad, the hair scanty, dark, and long, and the skin of an olive colour. They are generally shorter than the Caucasian race, and the Finns and Esquimaux are often very diminutive. These people are known as forming the *Mongolian race.*

Then, we have all seen the dark *Negro* class of men: we know them at once by their crisp woolly hair, narrow head, high cheek bones, wide nose, and thick lips. The natives of Africa south of Sahara, with those of Australia, New Guinea, and many other islands of the Pacific Ocean, are of this family.

Another, but less numerous and still decreasing race, is known as the *American* class, and consists of the *Red Indians* of the New World. In many respects they resemble the Mongolians; but the face, although broad, is less flat, and the nose more prominent, and they have little or no beard. They are generally of a red or copper colour.

In the *Malay* race, the head is narrowed, the features generally more prominent, and the cheek bones less so

than those of the negro. The inhabitants of Malaya, and some of the islands of the Indian and Pacific Oceans, belong to this class.

LESSON XVIII.

CONDITIONS OF MANKIND.

We have all heard of people, who, in their habits, modes of life, and outward condition generally, are very different from ourselves. Robinson Crusoe's man Friday, is an example of the better class of *savages:* but he was in danger of being killed and eaten by men far more wild than himself. When men are so rude and barbarous as to kill and eat one another, they are called *cannibals.*

All savages live so rudely and have such barbarous customs, that we should be greatly shocked to witness them. Men, in this condition, obtain their food by hunting or fishing; and when they catch no prey, they eat such roots, fruits, or herbs, as they can find. They do not, however, suffer so much from hunger as we might at first suppose; for, living as they mostly do,

in warm climates, and being few in number, vegetable food is sufficiently abundant to support life. Many tribes of savages have little or no clothing, and sometimes not even a rude hut for a dwelling. They are also ignorant of the value of metals, and of the means of obtaining and working them. Many of the Pacific islanders are savages; as also, are the natives of Madagascar, Patagonia, Australia, and the interior of Africa.

There are many tribes of men in a condition somewhat above that which we have now described; as, for instance, the Red Indians of North America: these make some provision for the morrow; they dry and preserve their spare venison and other meat; they build wigwams, or huts, procure furs and hides, which they sell to the white men in exchange for blankets, muskets, gunpowder, and spirits. In some cases, they cultivate a little patch of ground around their wigwams; but, as their supply of vegetable food is but limited and uncertain, when *animals* get scarce they seek new hunting-grounds; and sometimes fierce and cruel wars are carried on for the possession of favourite tracts.

Our own country may be taken as an example of the highest *civilization* yet attained by man. We have

stores of all kinds of food. Our barns and warehouses contain large supplies of corn, sugar, tea, cotton, wool, and other articles. Ships are constantly bringing goods to our shores from all parts of the world. Our land, too, is so well cultivated, that comparatively little of it is left waste or unproductive. The goods made, or *manufactured*, by the British are prized in nearly all parts of the world. *Factories* are very numerous, and the varied and powerful machinery used, shows the great skill and ingenuity of the people. By means of roads, canals, railways, and steamboats, we have the best and quickest communication in the world.

Every one is also pretty certain of enjoying whatever rightfully belongs to him. Thus, men are willing to sow or work, knowing that, in due time, they shall reap the result in peace and safety. When disputes do arise, or wrong is done by any one of the community, there are *laws*, to which an appeal may be made for the settlement of the dispute, or the redress of the grievance: and, further, some of the wisest men in the land are continually devising means for the general welfare, and making new laws to suit the requirements of the time. We have, likewise, hospitals for the sick, asylums for

the infirm, churches, chapels, colleges, and schools for religious and educational purposes; and books are so cheap, that every working man may easily buy a few; while, at the same time, great efforts are made to extend to other lands the blessings which we enjoy.

England, France, Germany, and the United States of America, are among the most civilized nations in the world. All the countries of Europe possess some degree of civilization, although both in character and extent it varies in every nation. Thus, Russia and Turkey are less civilized than other parts of Europe; for, although the rich and noble of these lands may possess most of the comforts common amongst Englishmen, yet the poor labourers are very ignorant and rude, and possess only a small share of the necessaries of life.

Such a high state of civilization as we, in common with several other nations, enjoy, has not been attained but by years and years of effort. Nations, like individuals, learn slowly and by degrees; yet, when the first step from barbarism has been taken, they may go on in a course of continuous improvement for ages. And, on the other hand, an advanced and enlightened nation may, by indulging in luxury, selfishness, injustice, and

other vices, go back to a lower condition. Thus, Egypt Persia, and Assyria were, in ancient times, far more civilized, and therefore more rich and powerful, than they are now. Greece, and afterwards Rome, were also, in former times, the leading countries in the world; cultivating art, science, and literature so much, as to have become in these respects the teachers of other nations; while now, they are very much behind the more western countries of Europe in most of the elements of civilization.

When a nation is in a condition between those described, it is said to be *half civilized*. The Chinese, Turks, and Egyptians are in this condition; and it may be remarked, that most eastern countries are more *fixed* in their habits and condition than the western nations.

LESSON XIX.

MINERALS AND METALS.

It may be observed that the soil or earth varies, not only in its nature, but also in its depth; and that it rests upon a different kind of material in one place from what it does in another. Thus, while in many parts in the

west of England, the soil is so thin that we can easily dig down to the hard rock, in other districts, it is much thicker, and is followed by layers of *gravel*, *clay*, *marl*, or *chalk*. Any one who has travelled from London to Bristol must have noticed this difference.

From London to Reading, we see a plain, open country, rich in grass and grain, with signs of a *clay subsoil*, being turned to account in the brickmaking going on here and there. Onwards, from Reading to Chippenham, grass and corn are still visible, the latter not quite so rich and plentiful; and, instead of clay, there are occasional signs of the *chalk* that exists a little beneath the surface, and which shows itself principally on the slopes and hill-sides. After passing Chippenham, the hills become more frequent, and of a more precipitous character. Now, hard, white, grey, or brown *stone* shows itself in large masses; and *stone-quarries* take the place of the *brick-fields* and *gravel-pits* of the neighbourhood of London. The streams, too, are generally more rapid; while in the immediate neighbourhood of Bristol, an occasional chimney with steam-engine shaft, and other indications, tell, that layers of *coal* exist at no great distance beneath the surface,

And travelling still further into Cornwall, we meet with a stone, called granite. Heaps of earth, rubbish, engine-houses, little streams of discoloured water—all mark a district in which the chief employment of the people is that of getting from the earth some of its treasured *metals*. In fact, in many parts of Cornwall and Devonshire, the *copper*, *tin*, and other metals *below* the surface of the earth, are of far more value than the plants that grow *on* its surface.

We may observe that, generally speaking, our most fertile lands do not yield any large amount of mineral treasure; being *alluvial formations* of sand, stones, and soil, which have been washed up by the action of water. Holland, part of Belgium, and Lower Egypt have been thus formed; and in these lands but little *mineral* wealth is obtained. *Gold*, however, is sometimes found mixed with the sand deposited by rivers. This occurs in the Niger, and other rivers of Africa, Brazil, and California.

But the most useful metals are obtained from districts where the solid rocks are near the surface. Thus, the *granite* and other rocks of Cornwall, the *quartz* of Derbyshire, the Hartz mountains in Germany, and

the Dofrine mountains in Norway—all contain valuable minerals.

There is no mineral of greater value to us than *coal;* in fact, its great abundance in Britain has done much towards making our country rich and great. The area or space where this mineral is found is called a *coal-field.* Our most important coal-fields are those of Newcastle (which has an area of about 200 square miles), South Lancashire, South Wales, and the Forest of Dean. *Coal measures* also exist in some other parts of Great Britain, as well as in Belgium, the United States of America, and some parts of France, Germany, China, and Australia.

Of the metals, although gold is of the highest *relative* value, yet *iron* has by far the greatest *real* value. This metal is also very generally met with. It is sometimes found in small quantities pure; but more frequently, it is mixed, either with hard stone or clay; and then has to be *smelted,* by which process the metal is withdrawn from the earth or stone with which it is mixed in the *ore.* The northern countries of Europe are very rich in their iron ores; those of Sweden, Norway, and Finland, being the most noted. France, England,

Scotland, and Germany, have also very extensive iron mines. The most important iron districts of England are in South Wales, Staffordshire, Yorkshire, and Shropshire.

Copper is another very useful metal, which, although less plentiful than iron, is yet found in many parts. Our most valuable copper mines are in Cornwall, where also *tin*, which is a far more scarce metal, is likewise obtained in great abundance.

Besides the *tin* mines of Cornwall (which have been worked for upwards of two thousand years), the mountains of Germany, Spain, Mexico, and the southern part of India, supply this metal more or less abundantly. The precious metals, as they are called—*gold* and *silver*—are obtained from the Ural mountains, Peru, Brazil, and Chili, in South America; while California and Mexico, in North America, and Australia, supply large quantities of the former metal.

Platina, *quicksilver*, *zinc*, and *arsenic*—are also obtained from some of the metal districts already named. *Slate*, another useful mineral, is quarried in large quantities in North Wales; while many parts of England are rich in various kinds of building stones. The *Portland*

stone, of south Dorsetshire, *Bath stone*, of Somersetshire, together with the marble of Devonshire, and various limestones and sandstones, are all of great value and importance.

LESSON XX.

EMPLOYMENTS OF MANKIND.

We have seen that the way in which men obtain their food, shows, to a large extent, how far they have advanced in civilization; that enlightened nations never rely for their supply of food upon so precarious a source as hunting; and that people who plough, and sow, and reap, have made important steps in civilization. The *employments* of the people of different countries, however, depend upon many circumstances besides the degree of civilization to which they may have attained.

The land of a country alse differs in many respects. Some districts are tolerably level, while others are hilly: some parts again have a clay soil, while others consist of sand or stone. Now, the character of the

land will, to some extent, influence the occupations of the people. High and rocky land can not be ploughed; but it often affords grass for sheep and goats.

When men are engaged principally in tending sheep and cattle, they are said to be engaged in *pastoral* pursuits. This occupation is principally followed in Eastern countries, where the Arabs, Syrians, Tartars, and some other tribes, live in this way. There are many beautiful illustrations of this kind of life among the early Patriarchs. Abraham, Isaac, Jacob and his sons, were pastoral people; and we read of their frequently seeking fresh ground for their flocks and herds. In consequence of having thus to roam from place to place, such people are called *nomadic* or *wanderiny* tribes. These races are scattered, have very little nationality (each tribe having its own chief, patriarch, or emir), and they are generally in a half civilized state.

Another occupation arising from the mode of employing the land, is *agriculture*. This was the labour assigned to our first parent, Adam; "for the Lord God took the man, and put him into the garden of Eden, to dress it and to keep it." When men till the ground, they must abide in one spot, in order that they may

reap what they have sown, and gather the fruits of the trees they have planted. And as more improved tools, and more skilful and profitable modes of culture, come into use, so food becomes more abundant: and thus, when it is seen that less labour is necessary to provide food for the community, some will very soon seek other kinds of employment.

In this way, better houses will be built, a larger and more varied supply of implements produced, and a larger quantity of clothing and many other comforts brought into use. Others will seek opportunities for exchanging their surplus agricultural produce for whatever useful articles their neighbours may be disposed to give in return. Thus, when men have become sufficiently settled to pursue agriculture with success, they generally add some other employment to it. Either, on the one hand, they find that they can turn some raw product to greater account by making it into a more valuable article, such as weaving cotton or wool into cloth, or making hides into leather, and thus become a *manufacturing* people; or, they seek for markets in which to dispose of their produce for a commodity of equal value; and thus commence a *commercial* career.

This course has been pursued by the inhabitants of Great Britain. In the time of the Anglo-Saxons, the inhabitants of this country were mainly engaged in agriculture, but gradually they improved their modes of culture, whereby labour was saved, which found more profitable occupation in converting raw produce into manufactured goods, and in trading with other and distant lands. For every *one* Englishman now engaged in tillage or husbandry, *two* are employed in commerce or manufactures.

When we speak of a nation being agricultural, commercial, or manufacturing, we mean that the pursuit named is the *chief*, but not the *only one* pursued by the people. Peace, freedom of trade, and the absence of undue taxation, are also highly conducive to the employment of men in arts and manufactures. A trade may be ruined by war or commotion raging in a district. The trade of Paris suffered severely during the commotion of 1848; and the persecutions to which the Flemings were subjected by Spain, greatly contributed to transfer the cloth manufacture from the Netherlands to England. It is, in fact, the accumulated savings of *industry*, which we call *capital*, that employs labour in

agriculture, commerce, or manufactures. In our country, capital is abundant, because safe and free, and hence, employment is provided for its *millions* of people.

LESSON XXI.

MANUFACTURES.

We have seen that the way in which the people of a country are employed, very much depends on the physical circumstances of the country;—its soil, climate, coast, and also its mineral and other products. We will now see how this applies to our *manufactures*. This term was first given to articles made by *hand*, it is now also applied to goods made by *machinery*.

The most important articles of manufacture may be grouped into three classes; first, *goods* made from fibrous or thread-like materials, such as cottons, silks, and also articles made from wool, hair, flax, and hemp. Most articles made from these materials are *woven*, and are called *textile* fabrics. The goods thus made are of many sorts and qualities, and are named accordingly. Thus, we have baize, flannel, blankets, and broad-cloth,

from *wool;* linen, lawn, and huckaback, from flax; silk, satin, and damask, from silk; calico, muslin, and many other goods, from cotton. Besides which, there are several articles made from a mixture of these materials. Irish poplin is a mixture of silk and wool; and there are many fabrics made of cotton and wool.

The next class of manufactures will comprise *metal* goods. Nearly all the wares sold by the ironmonger, the cutler, the tinman, the gold and silversmith, are metal goods. Machines of all kinds, a large number of tools, much of our furniture, and many important parts of houses and ships, are of metal. *Iron* is the most largely used metal, but several others are also much employed in articles of manufacture.

The next class of manufactures consists of articles which have undergone change, by some *chemical* or other process. The skin of an ox, for instance, is at first soft and yielding, but by being tanned, it is converted into the firm and useful article we call leather. Soap, again, is quite different from either the tallow or the soda of which it is made. Glass, paper, gas, beer, spirits, drugs, and many smaller articles, belong to this class of manufactures.

We should first learn *where* the most important manufactures are respectively carried on. Almost everyone knows that *Manchester* is famous for the *cotton* manufacture; even on shops and warehouses we may often see the words "Manchester Warehouse." In many other cases the name of a place is given to its most noted productions; as, *Paisley shawls*, *Nottingham lace*, *Norwich crape*, *Irish linen*, *Welsh flannel*. Many sorts of goods have been named from the places where they were first produced; thus, a well-known fabric from flax is called *brown Holland: calico* is so named from Calicut, in India; *nankeen* from Nankin, in China; *muslin* from Mosul, and *cambric* from Cambray. Many other places have given distinctive names to extensive *branches* of manufacture. Thus, we have the term *Birmingham goods*, for all sorts of hardware and metal articles; *Staffordshire ware*, for all kinds of pottery. Brussels and Kidderminster also give names to their carpets, as does Cheshire to its cheese, Saxony to its cloth, and Bohemia to a kind of ornamental glass.

We should next try to learn *why* a manufacture is carried on in any particular place. We shall find that physical circumstances have a considerable influence

in this respect. And though we may not always be able fully to account for the locality of any manufacture, yet we may be able generally to find some reason for the fact.

Manchester, for instance, owes its importance in the cotton manufacture mostly to the abundance of coal in its neighbourhood: iron, also, for the machinery, can be easily procured, and there is also a plentiful supply of water. Again, Manchester is near to Liverpool, the chief port to which the cotton is shipped.

Now, such an article as straw-plait does not require machinery or steam, but is a light operation performed entirely by hand. This manufacture we find carried on by women and children in rural districts, such as Buckinghamshire and Bedfordshire, where coal is not found, and where machines are almost unknown. Pillow lace, again, is a similar product of the human hand, and is made in those and other rural districts.

Generally speaking, the English manufactures that require to be worked by steam and machinery, are in the west and north-western parts of the country, where coal and iron are most abundant. The south-eastern parts have fewer manufactures, and those that

exist are of a kind requiring less machinery but more skilled labour. Great numbers of watches are made in London, as well as all kinds of jewellery. Leather is also made near London, where also, most of our books are printed.

LESSON XXII.

COMMERCE.

THE term *commerce* means the giving of one commodity for another, and thus includes all *buying* and *selling*, and in fact every kind of *exchange:* it is now, however, generally used in reference to the trade that one *nation* carries on with another.

All men that have made any advance in civilization have, to some extent, carried on commerce. The mode of conducting it may have been rude, and the means of conveyance slow and clumsy, yet, wherever goods plentiful in one region were taken to a country where they were scarce, and there exchanged for something more valuable to the buyers, there were the *essentials* of commerce.

Thus, in ancient times, the Midianites carried the spices, balms, and gums, that were so abundant in Persia and Arabia, to Egypt, where they were scarce, and took back in return corn and other plentiful products of Egypt. At first the goods themselves were used in making these exchanges, but as this was found to be in many respects inconvenient, the precious metals, gold and silver, soon came to be used as a *medium of exchange*. The value of the gold and silver was first ascertained by weight.

The wants of society soon created a class of men who undertook all the necessary exchanges on behalf of the producers. These men neither tilled the ground nor made any kind of goods, yet, by distributing the abundance of one country over others, did good to all; and while they often became rich themselves were also the means of benefiting and enriching others. Such persons are called *merchants*, which simply means, buyers and sellers. Those who deal in small quantities of goods are usually called *tradesmen*.

Commerce was first carried on by conveyance across the land. *Merchantmen* of ancient eastern countries travelled together for mutual protection in companies

called *caravans*, with their goods on the backs of camels. Towns soon arose in the routes taken by these merchants: here they rested their camels, purchased provisions, and made other arrangements for their further journey. The people in the neighbourhood naturally came to these places to make purchases when the merchants were there. *Tadmor* in the desert, or *Palmyra* as it was afterwards called, was one of the earliest of these places.

In the course of time merchants found the advantage of trading by sea. Many of the early eastern nations were settled in the neighbourhood of the Mediterranean. This sea was traversed by ships belonging to the *Phœnicians* and *Egyptians*. The Phœnicians, who inhabited a small strip of Syria on the coast of the Mediterranean, were for many centuries noted for their energy and success in commerce, and became the richest merchants in the world. They traded not only with the countries of the Great Sea, but ventured through the Straits of Gibraltar into the open Atlantic, and thus sailed to France, Britain, and Ireland, in the north; as well as to Africa in the south. The Phœnicians thus acquired a much more extensive

knowledge of Geography than other people of their time. Their little country became very populous, and, besides other towns, contained the famous *Tyre* and *Sidon*.

Carthage, in Africa, was founded by the Phœnicians, and became in time the chief centre of commerce, and more prosperous than the mother country. It was, however, conquered by the Romans, who made themselves masters of the known world When the Roman Empire was at length broken up by the northern nations, the civilized world was for some time too unsettled for commerce to flourish.

During the middle ages commerce revived: the Italian cities, *Genoa*, *Pisa*, and *Venice*, became renowned for their wealth and commercial success. And as northern Europe rose in civilization, the products of eastern countries came into use; and these, after being brought by the Italian merchants to Venice and Genoa, were conveyed thence to a number of German and Flemish towns, which then rose in wealth and importance.

At the close of the fifteenth century a new impetus was given to commerce by the discovery of the passage round the Cape of Good Hope. The Dutch extended

their voyages to the Spice Islands and Japan, of which they have since had the exclusive trade. The Portuguese, French, Spaniards, and British, seeing the advantage of commerce, entered into it; and very soon the trade of the world became much greater than it was in ancient times.

Owing to the discovery of America, colonization increased almost as rapidly as commerce. Most of the leading nations of Europe joined in the movement, and Great Britain laid the foundation of her extensive foreign colonies; which, with her vast trade, have mainly contributed to raise her to the present position of being the greatest nation on the globe.

LESSON XXIII.

COMMERCE, NO. II.

In our last lesson we learned that commerce arose from the wants of society; that it gradually increased, enriching nations and places that carried it on, and at

last became one of the chief objects of pursuit among civilized nations.

A very little consideration will show us how very much we are indebted to commerce for many articles of every day life. We wear clothing made from the *cotton* of *America*, the *flax* of *Russia*, and the *silks* of *France* and *Italy*; we drink *tea* that is brought from *China*, *coffee* from *Arabia*, and *sugar* from the *West Indies*: *rice*, *spices*, and many other products of warm climates we also use for food. Much of the wood of our houses is brought from Norway and other cold regions; while our *mahogany* is brought from the warm parts of South America. These articles, though brought from distant parts, are so common with us that they are used by all classes. In addition to these commodities, we have gold and silver from South America, California, and Australia. Wines and spirits we obtain from Spain, Portugal, France, and Germany. Furs, dyes, gums, oils, fruits, and many hundreds of other articles from various parts. In return for which we *export* immense quantities of cotton, woollen, and iron goods; also earthenware, machinery, coal, clothing, tin, copper, and many other products, all of which are of the

highest value to the foreign buyers. Thus, we see how mankind is benefited by trade and commerce:

> "Each climate needs what other climes produce,
> And offers something to the general use;
> No land but listens to the common call,
> And in return receives supply from all."

We may form some idea of the *present* extent of our commerce from the fact, that in the year 1856 there were above 24,000 British sailing vessels, and nearly 2,000 steam vessels. In addition to this, ships of other nations are employed in exchanging their commodities for ours. At the port of London alone, above 10,000 foreign ships enter every year, and double that number of smaller vessels are employed in the coasting trade.

Many other nations have succeeded in establishing an extensive shipping trade. The Americans, the French, and the Dutch, have, next to ourselves, the largest *mercantile navy*. We may enquire, *why* so small a country as ours should transact so large a share of the commerce of the world. We are aware that the greatest trading cities were situated somewhat *centrally*, in regard to the nations requiring each other's produce. The cities of Phœnicia, in early times, occupied this

position : that is, they were in the centre of those parts of the world then most civilized. The Italian cities of the Mediterranean, also, during the middle ages, were thus centrally situated between the most flourishing countries of Europe and the East Indies. We shall find that *England* is *now* thus advantageously situated as regards the most important countries of the globe. On the east and south are the most flourishing and commercial nations of Europe, and to the west is the vast continent of America.

The *insular* position of Britain is another cause of its extensive shipping trade. The sea is "the great highway of nations," and instead of keeping civilized countries from each other, as might be supposed, it really forms a link that binds them together.

The excellent *harbours* of our coast are another cause of our commercial success. Many of these harbours have been rendered safe and convenient by great labour and skill. The dangerous parts of our coast are also marked by lighthouses and other warnings.

The spirit and energy of the people, their fondness for the sea, and the skill and courage of our sailors, have also contributed greatly to our maritime

superiority: while the abundant capital and other resources of the country have been willingly applied to foster this branch of national pursuit.

The coast of Britain has a larger number of flourishing towns than that of any other country. But by far the most important port in the world is LONDON, and this great city owes its success chiefly to its excellent position on the river *Thames*. This noble river is accessible for ships of all sizes, while its spacious docks can accommodate immense numbers of vessels, and its warehouses for foreign produce extend for miles. Land communication, by means of railways, has also increased wonderfully during the last few years, and has given great facilities for extending our commerce. This mode of communication is also rapidly increasing in all civilized countries.

LESSON XXIV.

THE RELIGIONS OF MANKIND.

ALL men recognise the power of a being higher than themselves. The opinions which men hold respecting the Supreme Being, and the modes they adopt of showing their regard for Him is called their *Religion*.

Savage nations generally have rude and debasing ideas on this important subject. Some believe that there are *many Gods*, each ruling over some part of nature: that one governs the sun, another the moon; while others rule over different parts of the earth. Many people are so ignorant as to suppose that trees, rivers, and figures of wood or metal are either gods themselves or contain gods within them. People who have no higher knowledge of religion than this are commonly termed *Pagans* or *Heathens.*

The countries in which Paganism prevails are very uncivilized; for the higher forms of religion promote civilization. Pagans, however, differ considerably in their religions. Those who live in the interior of Africa regard certain common objects, as a piece of stone or a stick, as gods. The worship of such things is called Fetichism.

The natives of India believe in numerous gods, some more powerful than others. Costly temples are built for these imaginary deities, while the less mighty gods are kept in the house. The Hindoos also regard the river Ganges as sacred; some drown themselves in it, thinking thereby to secure future happiness. This

religion is called *Brahminism*, and its priests or Brahmins are looked up to as the highest class or *caste* of the people.

The Chinese hold a religion known as *Buddism*, which is very debasing and oppressive. The North American Indians believe that the chief things in nature are deities. They therefore worship the sun, the moon, the great oceans, rivers, lakes, and winds.

The Turks, together with the Egyptians, Arabs, and Moors, are *Mahometans;* that is, followers of Mahomet, a pretended prophet, who lived in the sixth century. Mahomet's great aim was to establish himself as a prophet and leader of the Arabians: and having succeeded in this, he spread his religion by the sword where he could not otherwise gain converts. He wrote a book called the *Koran*, in which he borrowed from the Jews and Christians the belief in *One God.*

The knowledge of the TRUE GOD became nearly lost to mankind about two thousand years after the creation, when the call of Abraham took place. The record of this is in the *Old Testament*, and the descendants of Abraham, the *Jews*, still exist as witnesses of the truth of the Sacred Scriptures. The Jews, however,

do not form a territorial nation, but are found in nearly every kingdom of Europe, and in some parts of Asia. Their religion is that of the *Old Testament Scriptures*, and is known as *Judaism*. They read the "*Law and the Prophets*," and believe that the *Messiah* is yet to come and restore them to their ancient country, Palestine.

The remaining inhabitants of the earth profess to be followers of the *Saviour Jesus Christ*, and are therefore known as *Christians*. They adopt the *Bible*, both Old and New Testaments, as containing the fullest revelation that God has made of himself and of His will to man. The Christian religion teaches that all men are *brethren*, and that we must try to do good to all. It inculcates a loving and forgiving spirit toward each other, while it commands us to love God *above all:* it enjoins purity of heart, a life of holiness and usefulness, and faith in Jesus Christ.

The Christian religion is professed in all the countries of Europe except Turkey, and in the *colonies* settled by Europeans. Christianity had spread over nearly the whole of the Roman Empire, but when that great power was sinking to decay, it became divided

into two parts. The *Eastern Empire*, with Constantinople as its capital, adopted that form known as the *Greek Church:* while the *Western Empire* held to the doctrines and practices of the Church at Rome, and hence was called the *Roman Catholic Church*. The Russians and Greeks belong to the former church, while the latter embraces the majority of the inhabitants of Italy, France, Austria, Spain, Portugal, and Ireland.

The third great branch of Christianity consists of the *Protestant Churches*, which were so named from Luther and his followers protesting against a decree of the diet of *Spires*. Wiclif, and other *Reformers*, had previously done much towards bringing about the Reformation. The Protestant faith prevails in Great Britain, Holland, Norway, Sweden, Denmark, North America, Australia, and the other British Colonies. In Prussia and Switzerland about one half of the people are Protestants and half Roman Catholics.

There are also many divisions or *sects* of Protestant Christians, differing on minor points of doctrine or church management. The *Episcopalian* form is adopted nationally in England and Ireland; the *Presbyterian* in Scotland; the *Lutheran* in Denmark, Sweden, and

Norway. A large number of Protestants also differ from these forms, and are generally termed *Dissenters*.

The great superiority of Christian nations over those of other religions, shows how very important religion is in influencing civilization and general improvement; while it is also the subject of man's deepest regard in relation to a *future* state of existence.

LESSON XXV.

GOVERNMENTS.

Most of us know something of the *government* under which we live: we have all heard of our good Queen Victoria, of our *Judges* and *Magistrates*, and of the *Two Houses of Parliament*. By having good laws and proper officers to enforce them, we feel safe from injustice and violence. The most powerful and wealthy men in our land dare not injure or oppress the poorest labourer: all being alike protected by our laws.

There are no records of the origin of governments and laws; early societies were too unsettled and imperfectly civilized to establish at once any regular form of government. It is most probable that the first kind

of rule among men was that of the *Patriarch* over his family and servants. Tribes or families would often unite for hunting, or for expeditions against other tribes; when the importance of having a good leader would soon be felt, and the most hardy and experienced person would be chosen as the *chief*. In this way, most likely, many of the ancient kingly governments were formed.

Governments are usually divided into three kinds: the first is that in which the chief power is in the hands of one person, this is called a *monarchy*. The next is where the power is in the hands of a few; and this is called an *aristocracy*, or literally, a government by the best. The third kind is where the governing power is in the hands of the *people;* this was by the Greeks called a *democracy*, and by the Romans a *republic;* we often call it a *commonwealth*.

There are two kinds of monarchies; that in which there is no check or limit to the power of the one ruling person is called a *despotism*, or an *absolute* monarchy. This kind of government is very prevalent among the imperfectly civilized nations of Asia, as Persia, Turkey, and China. Several European countries are also abso-

lute monarchies, as Russia, Austria, and most of the States of Italy. Despotic governments have not been found to contribute to the general welfare of a country.

The other kind of monarchy is that in which the powers of the sovereign are defined, and some of the functions of government are exercised by others, as the laws direct. This is called a *limited* or *constitutional* monarchy. With us the *laws* are paramount, and to them all have to conform, from the *Queen* on the throne to the poorest peasant. Most of our laws have been fixed and settled for many years; indeed, some of them are but immemorial customs. All new laws, or changes in old ones, are made with very great care by the *House of Commons*, which is elected by the people; and the *House of Lords*, which practically represents the aristocracy: while the Queen's consent is also necessary to every measure before it becomes law.

The Queen, with the help of her *Ministers*, regulates all matters of war and peace with other nations, and appoints the judges, magistrates, and administrators of the laws. The *taxes* for the support of the government, however, are not imposed by the Queen, but by the *representatives* of the people in Parliament.

Most constitutional kingdoms have laws founded on the same principle as ours, namely, that of giving the people power to elect representatives whose business it is to arrange taxation, and to assist in making laws. The principal countries having constitutional governments are Holland, Belgium, Sweden and Norway, Denmark, Spain, Portugal, Sardinia, and Greece.

There are now but very few examples of *aristocratic* governments, although the aristocratic element exists, and its influence is very considerable in most countries. The remaining form of government is called the *republican*, of which the United States of North America forms the most prominent example. The Americans have a House of Representatives elected by the people, much like our House of Commons; they have also a *Senate*, or Upper House, as our House of Lords: and the chief *executive* authority is vested in the *President*, who is elected by the people for four years. Each state, also, has its own Governor, Senate, and House of Representatives, by whom laws are made, and all matters conducted that relate to the internal and domestic affairs of the individual state.

In civilized states there are always efforts being made

by some to obtain more freedom, and by others to preserve and secure what has already been obtained. The highest amount of freedom, with security of life and property, have nowhere been so fully attained as in our happy country.

LESSON XXVI.

STATES AND NATIONS.

When we look at a map of the world, we see at once that some parts are separated from others by *natural boundaries*, such as seas, rivers, or mountains. The Mediterranean *sea* divides Europe from Africa, while the Ural *mountains* and the *river* Volga separate it from Asia. Many smaller portions of land are divided in the same way.

Now these *natural* features, to a large extent, not only form divisions of the land, but they often mark out also the limits of *states* and *nations*. Thus, the English Channel separates lands that are inhabited by people varying in language, laws, government, and habits. Yet, on the other hand, Ireland is cut off

from us by a somewhat wider channel, and yet forms a part of the *same* state, being included in the UNITED KINGDOM OF GREAT BRITAIN AND IRELAND.

Again: looking at a map of Europe, we observe how naturally its most south-western peninsula is marked off from all other lands, having the sea on all sides but one, while there the Pyrenees mountains form a most decided boundary. We might hence conclude that this peninsula is but *one country*. This, however, is not the case; for it consists of *two* independent kingdoms, namely, *Spain* and *Portugal*. And the line dividing these two countries is, to a large extent, an *artificial* one, that is, one determined by other than *natural* features. Thus, although many countries are separated by natural boundaries, yet we cannot look to these alone to ascertain the *national* or *political* divisions of the world.

It may also be remarked, that while the natural features of the world remain, age after age, the same or nearly so, yet its political condition is frequently changing. The United Kingdom, for example, has but *very gradually* grown to its present extent. Not only Ireland and Scotland, but Wales also, were, a few

centuries ago, separate and independent countries. And now, in each of these several parts of the British Empire there are remains of their individual nationalities, in *language* and *customs*.

From history, also, we learn, not only that existing nations have altered their *frontier* at various periods, but that many great states have sunk into insignificance, or have wholly passed away. Greece, that gave laws, arts, and science to the greater part of the ancient world, is now one of the minor states of Europe. Babylonia and Assyria, whose proud kings once ruled the eastern world, are now no more.

We may hence conclude that national existence and limits depend very much upon the character and habits of the people themselves. An industrious, energetic, prudent, ingenious, and virtuous people are often seen gradually enlarging their borders: whereas, when they sink to the love of ease, or become selfish and unjust, they decline and fall.

For these reasons we can easily see that *old* maps are nearly useless for teaching *modern* Geography. A map of Europe made before the close of the last great war between France and the Allied Powers of Europe,

is, for example, almost useless, owing to the many territorial changes made at the Congress of Vienna.

The present leading states of Europe are, Great Britain and Ireland, France, Austria, Prussia, and Russia; each of which has its own form of government, laws, language, manners, and habits. The extent of these empires and kingdoms has varied much at different times, and some of them, particularly Russia and Austria, have either by conquest or treaty, acquired power over many of the smaller European states that were once independent. Thus, Austria now possesses a large part of Italy and Poland, while Hungary, which was a few centuries ago a very powerful kingdom, is now included in the Austrian Empire.

In Asia, China continues, as it has been for thousands of years, the most populous, and in some senses, the most important empire. India, with its many millions of inhabitants, is principally under the power of the British. Most of the other states of Asia are weak and of little influence.

Africa contains no kingdom of great size or importance. Egypt is, as of old, the chief country of Africa. The British, French, and Portuguese possess

some colonies in Africa, while the remaining, and largest part, consists of independent, half civilized, or even barbarous states.

The most celebrated power in America is that of the United States, which has rapidly risen from a few European colonies. Mexico, in North, and Brazil, Peru, and Chili, in South America, are the next most important states of the New World.

The study of such facts as are contained in this lesson, is called *Political Geography*, which, to a large extent, arises from, and is closely connected with, that of *Physical* Geography, of which this little book has mainly treated.

LESSON XXVII.

GENERAL AND RECAPITULATORY.

THOSE who have gone carefully through the preceding pages will, we trust, be induced to make further enquiries on the subject of Geography. The *manner* of pursuing such enquires has been shown in the lessons. In the first place, *facts* must be carefully

observed, and, where possible, their causes and effects traced out.

There are also several matters belonging to other sciences, which must be understood in order that our knowledge of Geography may be useful and complete. We have, for example, read of the distribution of plants and animals, and these matters invite us to learn all we can of *Botany* and *Natural History*. Every schoolboy has opportunities of examining the plants of his neighbourhood, and of noticing the birds and insects he may meet with. A country clergyman in Hampshire collected a large amount of valuable information of this kind, which he carefully wrote down, and thus produced one of the most interesting books in our language—"The Natural History of Selborne." Now, no one expects *beginners* to do anything like this at first, but the *habit* of attentive observation will qualify even *schoolboys* to be of *some* service in this way.

We have lately heard of the travels and discoveries of Dr. Livingstone. This brave and good man let nothing escape his attention. Though having to undergo great toil, and face great dangers, yet he

collected a vast amount of knowledge of the Natural History of Africa, although this was quite secondary to his great object as a Christian Teacher. Many of the seeds and specimens of plants thus brought home will, very likely, be soon grown commonly in Europe. In this way we see how nations may be benefited by the attentive observation of individuals. To Raleigh we owe the potatoe; to Dahl the beautiful flower, named after him, the dahlia.

It was but a few years ago that we first heard of *gutta percha*. This substance has now become an important object of commerce, and is used in a great variety of articles. At Singapore, Dr. Montgomerie noticed that the handle of a woodman's axe was of a substance new to him: not content with merely looking at it, this gentleman examined it thoroughly, and found that it became plastic as clay, and could be moulded into any form, by being heated, and that when cold it became rigid and hard as before. He procured as much as he could and sent specimens to England, and thus we have this useful article now common among us. The best travellers do not visit foreign countries merely for pleasure, or simply for

learning the situations and names of places, but for the higher purpose of studying the *nature* of the *productions* and the *habits* and *conditions* of the *people.*

Another science that will help us much in our knowledge of the earth, is *Astronomy.* From this science we may learn more fully the relation our earth bears to the sun, moon, and stars; the causes of day and night, winter and summer, tides, eclipses, and other phenomena connected with the heavenly bodies.

From Geology, also, we may learn much that will render some parts of Geography more plain and interesting. It will teach us the nature and position of the *materials* of which the earth is *composed;* the causes of many of the changes that are now taking place on its surface; as well as the probable cause of mountain and valley, hill and plain, and the varied yet beauteous order of things that we now see.

QUESTIONS.

The following questions are intended to supply *home exercise*, in *writing:* and should be *preceded* b a more detailed *viva voce* examination.

LESSON I.—1. What is Geography, and how may it be be learned? 2. Give an account of the *(place)* in which y live. 3. Describe the neighbourhood, stating the articles made a objects cultivated. 4. How is England divided? 5. How mu land does a county generally contain? 6. How large is Euro compared with the whole world? 7. What shape is the earth

LESSON II.—1. State generally how land and water are distribut over the earth's surface. 2. Define the words *mountain*, *valle sea*, and *ocean*. 4. How much of the earth's surface consists water? 4. What would follow if there were much less wate 5. What if greatly more? 6. Where are our great trading tow situated, and why?

LESSON III.—1. What is a map? 2. Describe a coast lir 3. How are rivers and mountains marked on a map? 4. W cannot you tell the *size* of a country from the *map* of it alon 5. How may the earth be most correctly represented? 6. H may the *whole* surface of the earth be shown at once on a ma

LESSON IV.—1. What words are used to express the relative p sition of places on the earth? 2. Name a town to the nor south, east, and west of where you are living. 3. Explain t terms *south-west*, *south-east*, *north-east*, and *north-west*, a give examples of places so situated of you. 4. Define the ter *peninsula* and *isthmus*, and give two examples of each. 5. Wh is an ocean?

LESSON V.—1. Define a *coast* or *shore*, and mention the objects seen there. 2. Compare the coast of Europe with that of Africa. 3. Show how this affects the condition of the inhabitants of these parts of the world. 4. How are Switzerland and Holland affected by the action of the river Rhine? 5. Show the value of a natural bay. 6. How are bays sometimes made more safe?

LESSON VI.—1. What names are used for the several kinds of water-courses? 2. Whence do rivers obtain their supply of water? 3. Explain how clouds are formed? 4. What causes the clouds to discharge their moisture? 5. What influence has the atmosphere in producing rain?

LESSON VII.—1. Name the highest hill you have ever ascended, and say how high it is. 2. How many times higher than this is Snowdon,—Mont Blanc,—the highest of the Himalayas? 3. Explain the terms *range* and *chain* as applied to mountains. 4. What is meant by a watershed? 5. Describe the features of a mountainous district.

LESSON VIII.—1. Wherein does a sea differ from an ocean? 2. How may the saltness of sea-water be accounted for? 3. What is the depth of the ocean? 4. What is meant by a current? 5. Name one, and describe its course and influence.

LESSON IX.—1. What are the tides? 2. Give illustrations, showing differences in the height of the tides felt. 3. Explain how these are caused. 4. How are the tides produced? 5. Show the positions of the sun, moon, and earth, when *spring* tides occur. 6. Show the same at *neap* tides.

LESSON X.—1. What is the shape of the earth? 2. Define the words *circumference* and *diameter*. 3. At what rate does the equator of the earth rotate? 4. Explain the terms *latitude* and *longitude*. 5. What evidence of motion, either of the heavens or the earth, have we daily? 6. On what grounds do we conclude that the earth rotates?

LESSON XI.—1. Describe the seasons of our own country. 2. What changes of weather occur at the equator? 3. What, in the polar regions? 4. What causes the difference of heat in our summer and winter? 5. When are the days and nights equal in all parts? 6. Explain generally how the seasons are caused.

LESSON XII.—1. What is the atmosphere? 2. Mention some of the most important uses of the air. 3. How is it known that the air is not of an equal weight in all parts? 4. What is air called when in motion? 5. Where are the *trade* winds felt? 6. How are they produced? 7. What winds are felt on the sea-coast, and how are they produced?

LESSON XIII.—1. What is included in the term climate? 2. Upon what does climate chiefly depend? 3. Name the zones, and give their limits. 4. Show by examples the effect of *elevation* in regard to climate. 5. How does the *sea* affect climate, and why? 6. How *mountains?* 7. Upon what else does the climate of a conntry depend?

LESSON XIV.—1. What is the soil, and how may we find out what it consists of? 2. Name the principal kinds of soil, and show why they are so called. 3. Give examples of the adaptability of some plants to particular soils. 4. Name the chief corn-growing counties of England. 5. How are other kinds of land used?

LESSON XV.—1. For what is the vegetable kingdom most remarkable? 2. Give illustrations of the abundance of vegetation. 3. What are the most important conditions that regulate the distribution of plants? 4. Name the chief plants of *tropical* regions. 5. Of *temperate*. 6. Of *frigid*.

LESSON XVI.—1. Name the animals most common in our country. 2. Upon what does the distribution of animals chiefly depend? 3. Explain the terms *migrate* and *hybernate*, with examples. 4. Compare the animals of tropical with those of temperate climates. 5. What animal is peculiarly useful in cold countries?

LESSON XVII.—1. Give illustrations of man's capability to live in all climates. 2. Name the most suitable kinds of food for man in different climates. 3. What influence has a *hot* climate upon men? 4. State the advantages of a *temperate* climate. 5. Name the great races of mankind, and give examples of each.

LESSON XVIII.—1. Describe the conditions of savage life. 2. Name some people half civilized. 3. Give a description of civilized life. 4. Upon what does such a state depend? 5. Name the most civilized nations of mankind.

LESSON XIX.—1. Describe the appearances of the country between London and Bristol. 2. What do these indicate? 3. What is meant by an *alluvial formation?* 4. Name the most valuable minerals, and state where they are severally found.

LESSON XX.—1. Upon what do the employments of men chiefly depend? 2. What is meant by *pastoral* life? 3. What advantages have *agricultural* over *pastoral* pursuits? 4. What changes of occupation have the people of our country undergone? 5. What are the chief circumstances that promote manufactures and commerce?

LESSON XXI.—1. What is meant by manufactures, and how may they be classed? 2. Give examples of goods, the *names* of which show *where* they are made. 3. Supply similar examples in which the name indicates where the articles were *first* made. 4. Name the most important manufactures in your neighbourhood, and give reasons for their establishment. 5. Why is Manchester the seat of the cotton manufacture?

LESSON XXII.—1. Define commerce. 2. Show how commerce was carried on in very early times. 3. Account for the greatness of ancient Tadmor. 4. What cities on the Mediterranean became commercially great, and account for their rise and fall? 5. What European towns led the way in the extension of commerce?

LESSON XXIII.—1. On what grounds may we conclude that the British carry on an extensive commerce? 2. Mention some foreign products now in common use, and state whence each is procured. 3. Give some facts showing the extent of British commerce at the present time. 4. Name other countries of Europe in the order of their commercial importance. 5. Describe London as a port.

LESSON XXIV.—1. What is necessarily included in the idea of religion? 2. What are the most common forms of paganism, and where do they prevail? 3. When, and by whom, was Mahometanism established? 4. What faith is held by the Jews? 5. Name the principal churches known as Christian, and how have they severally arisen?

LESSON XXV.—1. What are the common advantages of law and government? 2. Name the principal kinds of government. 3. Describe a despotic government. 4. Why is our government termed a limited monarchy? 5. Name some countries having governments similar to ours. 6. Describe the government of the United States.

LESSON XXVI.—1. Supply instances in which natural boundaries exist between countries. 2. Wherein do the English Channel and Irish Sea differ as boundaries? 3. How is *the Peninsula* divided? 4. Illustrate, by examples, the varying character of political divisions. 5. Define physical and political geography. 6. Name the principal states of Europe, Asia, Africa, and America.

LESSON XXVII.—What course should be followed in studying geography? 2. Name some other sciences that help us to understand geography. 3. Give examples of the great practical value of observation.

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